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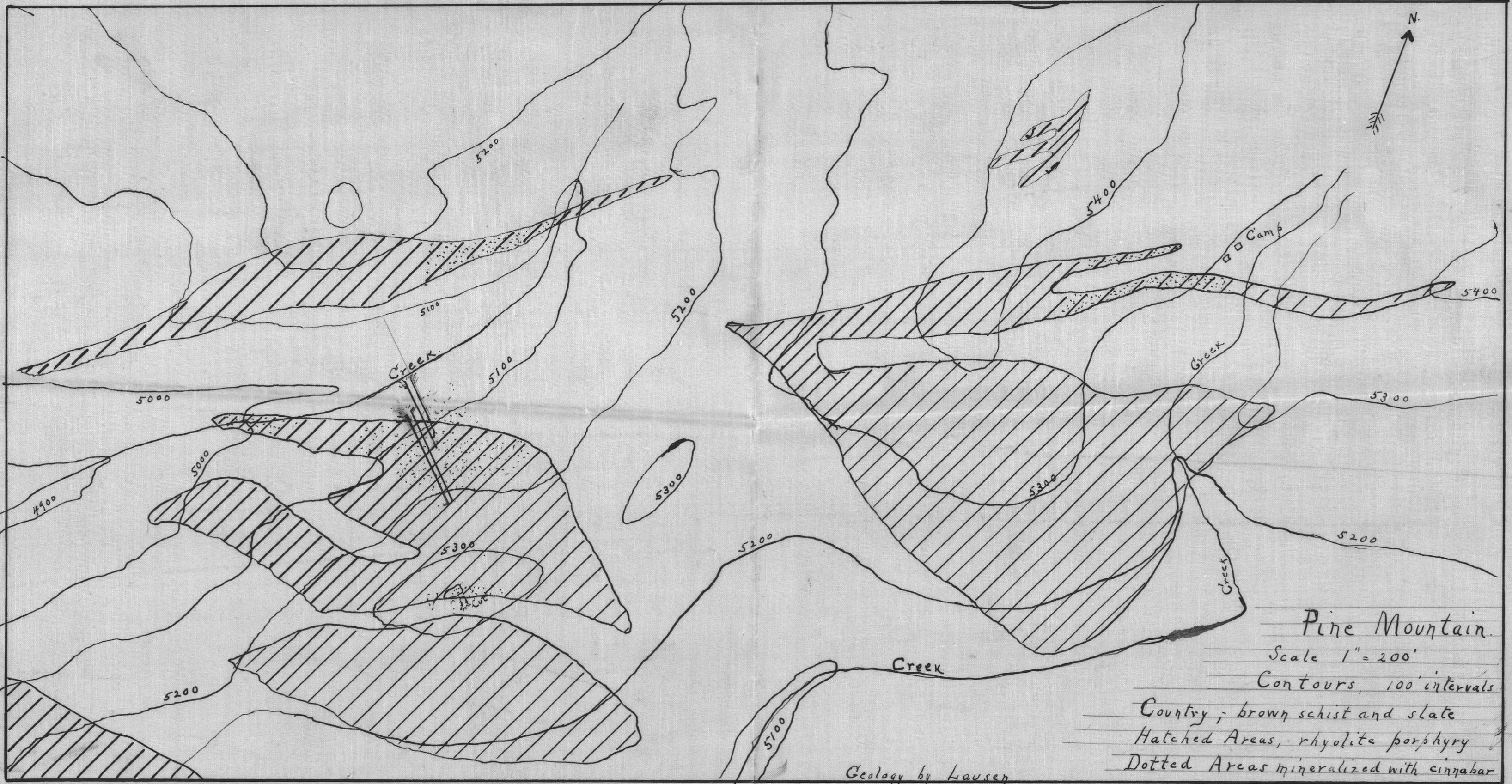
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Pine Mountain.

Scale 1" = 200'

Contours, 100' intervals

Country; brown schist and slate

Hatched Areas, - rhyolite porphyry

Dotted Areas mineralized with cinnabar

Geology by Lauser

1 page - e I.  
at Tonoph - Belmont -

1 - page of 2 (copy)  
in (E.M.C.)

1937

1 page  
1 - report (J.S. Hazen)<sub>10</sub>

1926 -

1 - 2 page c (D.M.)  
Barringer, Jr. 1926 - <sub>10</sub>

1 - 1 page  $\tau$  by

G. J. Harbauer - 1/5

1929

4 page  $\tau$

1 -  $\tau$  / - 1917 by

L.F.L.H.

10

11



Mazatzal Property

February 26, 1930.

Dr. L. H. Duschak,  
Hobart Building,  
San Francisco, California.

Dear Duschak:

I have delayed in replying to your kind letter of the 17th until I could discuss the contents of same with my friend, Mr. Gohring, who is the engineer interested in the cinnibar property of which I wrote you.

Gohring and I had a conference yesterday and he is still very strongly of the opinion that the property merits development by drilling and that there is an excellent probability that a substantial tonnage of a .25% mercury ore will be developed, although he admits that no substantial quantity of this grade of material can be estimated at the present time.

After giving the matter rather careful consideration, and particularly in the light of the information contained in your letter, I am afraid that there would be but little possibility of making a lower grade ore profitable, principally on account of the remote location and the difficulty of transportation to and from the mine, and I do not feel that I can recommend this at the moment to the parties whom I thought might take an interest, since they are anxious to engage in th

Dr. L. H. Duschak - 2

February 26, 1930.

operation of a developed property rather than in the exploration of promising mineralized sections.

I am enclosing a statement which Gohring made up concerning the property and which I think you will find conservative and interesting, and he is an extremely reliable engineer and has considerable knowledge concerning the deposits in the Mazatzals. Since Gohring examined this property, other parties who have recently had an option, did some development at greater depth and I am advised that they were finding indications of a considerable tonnage of .2 to .3 ore when their money ran out and their work was discontinued.

Gohring and others with whom I have talked seem very confident that eventually the district in which this property is located will prove to be a large mercury producer and possibly the Bradleys, or some others with whom you are associated, might be interested in further investigating, since I understand that very reasonable terms could be made with the owners and the property leased for a long period of time without any payment, other than royalty in case production was made.

I may write you again on this matter somewhat later, but just for the moment can't feel that I am in a position to go ahead as I fear that any worthwhile development would involve a heavier expenditure than my friends would care to consider, but they would be glad to cooperate with any larger crowd that might feel interested.

Dr. L. H. Duschak - 3

February 26, 1930.

As to the Chase Mining Company whom I mentioned in my last letter, these people were, I fear, of the fly-by-night variety and they blew up financially before they even got a good start with their many mining ventures.

With best personal regards, and again, many thanks for your letter,

Sincerely,

GMC:EBH

L. H. DUSCHAK  
CHEMICAL ENGINEER  
HOBART BUILDING  
SAN FRANCISCO

2  
A/26  
30

San Francisco, California,  
February 17, 1930.

Mr. George M. Colvocoresses,  
1108 Luhrs Tower,  
Phoenix, Arizona.

Dear Colvo:

Am sorry to be so slow in replying to your letter of February 4th. The situation that you outline is an interesting one and from what you have written, seems to have possibilities.

With reference to wet treatment, I am quite sure that there is nothing practical that can be done along this line. I have investigated all of the wet processes that have been mentioned in the literature and have made extensive tests with the sodium sulphide process. This latter process has a fundamental defect which renders it uneconomic.

I am enclosing a copy of a paper which I presented at the recent Institute meeting which will give you my impressions concerning quicksilver metallurgy. As you suggested, the cost of mining is a very important factor.

Generally speaking, cinnabar floats readily and there is no particular difficulty in recovering the mercury from the concentrate. I have worked out a design for a continuous resort, but have never had occasion to try it out. Your ideas as to milling costs will be better than mine. One of the first things that should be determined in connection with a large tonnage project of this kind is whether screening, presumably wet screening, could be used as the first step in concentration. As you know, cinnabar is quite friable. If the cinnabar occurs chiefly in stringers or in the softer portions of the rock, there will be a considerable tendency for it to concentrate in the fines. I can picture an operation consisting of coarse crushing, followed by tumbling in something like a tumbler barrel and wet screening, which might lead to a concentration of three or four into one with better than 50% recovery. In other words, it might be more profitable to throw away some of the cinnabar in order to obtain a higher grade feed for mill or furnace.

I note that some samples have indicated a grade of 0.25 mercury over a width of 35 ft. If there is a large tonnage

*hoped 0.25 = 35 ft. mercury*  
*all for*  
*part of the day*

Mr. Colvocoresses

-2-

Feb. 17, 1930.

of this grade which could be mined for 50¢ or even \$1.00 per ton, direct furnace treatment would be profitable unless the cost of fuel were excessive. With a furnace capacity of 100 tons or over per day, you are safe in figuring on 5 to 6 gallons of oil per ton of dry ore. Labor and power costs will not amount to much.

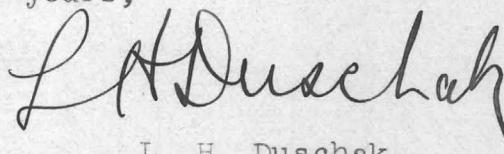
Assuming, however, that with cheap mining you cannot produce anything better than a 2 lb. rock, the success of the venture would depend pretty largely on the ability to make a rough concentrate by wet screening. Generally speaking, I believe that the cost of direct furnacing will be no more than the cost of floating and retorting the concentrate. Recovery will be about equal, with some advantage in favor of direct furnace treatment. With a 0.1% flotation feed, it is doubtful whether the tails could be held below 0.03 or 0.04, although in some cases on small scale tests we have gotten down to 0.01. When you think of this in terms of what is being done in copper flotation and bear in mind that the bulk of chalcopyrite per unit of copper is many times the corresponding value for mercury, you will realize that floating a 2 lb. mercury feed calls for mighty close work.

With information in regard to fuel and power costs, the hardness of the ore with respect to fine grinding and some rough data relative to screening possibilities, we can make a pretty close estimate as to the economic outcome with milling and retort as against direct furnace treatment. I will be glad to do some figuring on this with you and can easily have a few flotation tests made over in Berkeley.

Thank you for referring the manager of the Chase Mines, Inc. to me. I have not as yet heard from him.

With kindest personal regards, I am,

Sincerely yours,



L. H. Duschak

LHD/FM  
Enc.

Storm

Cloud

42

Slope = 73

Sea 1" = 20'

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Steps out

W 20", 2.06

W 34", 4.10  
W = 33", 4.75?

W 21", 2.60

1000' W

SW

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Surf.

RE: MOUNT ORD MERCURY MINE (In the Mazatals)

(From talk with Simis, February 11th, 1941)

Property consists of 400 acres i.e. 20 (patented?) claims and equipment comprises 25 H.P. Deisel Engine and Generator, compressor, rotary furnace and towers, drills, etc.

Location is on Sycamore Creek and land said to have value of \$10.00 per acre to ranchers. Equipment might sell for \$4000 to \$5000. Part of property was known as the Rattlesnake.

Mine is worked from adit tunnels and all are above the 200' level, has been stoped out but the vein has been opened on the 300' level and a winze put down to a depth of 385'. The width of the shoot is said to be 6-10' and no statement was made as to the length which had been opened up. Average grade is about 0.3% Hg - 6# per ton.

Present production about 25 tons of ore per day, which represents capacity of treatment plant. Output of mercury two flasks daily, equal 152 lbs., sold at contract price of \$164.00 per flask, making grade of ore about \$12.00 per ton. Mining and milling is comparatively cheap and substantial profits have been earned during recent months but very little ore can be considered as blocked out and no development campaign has been followed.

The mine is owned by a man named Hanney, living in California, who has operating contract with Hill and Foster. Hill has offered to sell on behalf of owner for \$25,000 with a cash payment of \$15,000. These terms appear reasonable if the mine gives any promise of continuing production for at least a year, during which profit should be upwards of \$30,000 at present price

Mount Ord Mercury Mine

#2

of Mercury.

I offered to examine property for Simis for fee of \$200 and Simis has written Hill today asking to obtain a 45-day option and if successful will wish to have me make the examination promptly.

Note: (Look up folder on Mercury in Mazatals and Arizona Bureau of Mines Publication.)

The MERCURIA MINING CORPORATION has started production of quicksilver in the Sunflower district north of Mesa, Arizona. This company has taken over, under lease and option, the Ord mercury mine and mill and has executed a purchase contract of the Reynolds' Mercuria Mine. Seven men are employed at present, but this number will be increased as work gets under way. Most of the ore at present is coming from the Mercuria Mine and being taken to the Ord Mill for treatment. Albert H. Johnson, Box 918, Mesa, is superintendent at the mine. O. E. Supple, 1943 $\frac{1}{2}$  North Argyle Ave., Hollywood, California, is president of the company; James McFarland is secretary, and Johnson acts as treasurer.

HG MERCURY IN MAZATZAL

January, 1942.

Mercuria, recent find owned by William Reynolds, Box 918, Mesa, and leased to A. H. Johnson, In Sunflower District.

In August, 1941, Ord Mt. was producing 25 tons per day for its own furnace.

Rattlesnake on Slate Creek owned by Packard Brothers of Payson, leased in January 1942 to McWaters and Long, of Globe, who are conducting development work. Was formerly operated in connection with the Ord Mt. and is said to have furnished most of the ore for their mill.  
February, 1942.

Papers recently published by American Institute of Mechanical Eng. give details re recent developments of mercury vapor boilers, which now seem to have a great picture. Might get these papers thru A.I.M.E.

*Mazatzal Mercury File*

February 12th, 1942

Mr. Walter A. Schmidt  
Western Precipitation Corp.  
1016 West Ninth St.  
Los Angeles, California

Re: Quicksilver Situation

Dear Walter:

I have noted with interest the contents of your letter of February 11th referring to your discussion with a personal friend concerning the possibilities of utilizing his process for the treatment of ores that would be obtained from small mines which might not be in a position to install their own treatment plants.

You are doubtless more familiar than I am with the present situation in California and Nevada, but it is my impression that most of the worthwhile properties in those states and in their vicinity have been pretty thoroughly investigated by the Gould-Hoover interests, the Bradleys, and others, and that nearly all of the better deposits are now being developed or operated.

The situation in Arizona is about as follows: A number of small mercury deposits have been found and partially developed in various sections of the state, including the Dome Rock Mountains, near the Colorado River, the Phoenix Mountains, a short distance north of this city, and the Copper Basin District, which is just west of Prescott, but none of those appear to me to have any substantial merit or to justify further investigation even during the present war condition when the price of mercury is so very high.

To the best of my knowledge the only attractive showings of this metal have been found in the Mazatzals Mountains, roughly one hundred miles east of Phoenix and southwest of Payson where a great deal of money has been expended at intervals during the past twenty years and several mines have been equipped and operated but always without profit to the operators until a couple of years ago.

The geology and ore occurrences in the Mazatzals were investigated to some extent by Ransome, Lindgren, and other well known geologists who were favorably impressed and more recently a thorough study of this region was made by Carl Lausen, geologist for the Arizona Bureau of Mines and formerly a geologist for the United Verde Copper Co. As you know I have twice visited this section of the state and examined some of the more promising showings and it was my conclusion that none of these, because of their location, erratic mineralization, and the average low grade of the ore could be profitably operated unless the price of quicksilver was at least \$100.00 per flask, but I have been equally convinced that operations were well justified and

2- Walter A. Schmidt

should be extremely profitable whenever the price approached the present level, which is very nearly double the figure mentioned.

At the present time three or four of the mines are operating and producing ore which is treated in the local plant erected by the mining companies and consisting of Gould furnaces that are on the whole quite effective. There are several other mines in the vicinity of those mentioned which have produced in the past and from which a small production has recently been made and some of these are also equipped with Gould furnaces as well as mining equipment and should be working today except for the fact that the owners or operators have failed to maintain their development and have merely gutted out the high grade ore that was already developed by the old operations without attempting to maintain an ore reserve through carrying on any further exploration or development.

All of these deposits are extremely pockety and no one could expect to maintain a production without keeping the development work well ahead of the mining, and this is just what the operators, most of whom are leasers, have failed to do.

From the above you will realize that the present situation calls for development money rather than an expenditure for treatment plants which, to a large extent, are already available, and it has been my thought that there was an excellent opportunity to obtain the necessary leases on four or five of the most promising of the inactive properties, expend a certain amount of money in development, and proceed with the operation, treating all of the ore in one or two plants which are already erected and would be turned over along with the lease.

While I have not made any recent investigation which would enable me to submit a detailed estimate of development cost and operating results I have been following the general situation pretty carefully and I am convinced that such a program as I have outlined above would be entirely feasible and reasonably certain to return the investment with a substantial profit during the next two years or more probably in half that time. Subsequently the program and the results of same would have to be largely dependent upon the price ~~of~~ demand ~~for~~ mercury which one cannot now foresee, but I understand that there is reason to expect that mercury vapor boilers will come into much more general use after the war is over and if the properties taken over under present conditions had been well equipped and fairly well developed in advance the cost of producing the metal should be decidedly less than at present, although I am only making my present suggestions because of the opportunity to work this thing out as a war baby which deserves particular attention without further delay.

I could not feel that the situation in the Mazatzals offers any favorable opportunity for such a program as has been suggested by your friend because, as mentioned, first-class treatment plants are already available and there, as elsewhere, the main difficulty lies in developing and mining the ore and not in treating it. It has always

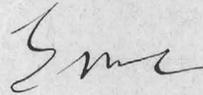
3- Walter A. Schmidt

been my experience that any custom plant is bound to run short of ore and therefore operate at a loss unless the same depends for its main supply upon one or more mines which are in the hands of companies that are well organized and well financed. The small mine owner, operators, and lessees, will follow a policy similar to that which I have outlined above and after working out small bodies of higher grade material and expending any profits which result therefrom for other purposes he finds himself short of both ore and funds and is obliged to shut down unless the custom plant comes to his rescue.

At Humboldt we could never have operated with any profit even when copper sold at a very high price except for the production of our own mines, the BlueBell and DeSoto, and other mines like the Swansea which we operated under lease, and I do not know of any of the mercury operators in the Mazatzals who could be depended upon to maintain a steady production unless the company which treated the ore would also assume the responsibility for mining and development.

Trusting that the above has fairly well covered the situation and suggested some possibilities which may be of interest to your friend, I remain

Yours very truly,



GMC:DF

# WESTERN PRECIPITATION CORPORATION

*Chemical Engineers*

MAIN OFFICES & LABORATORIES  
1016 WEST NINTH STREET  
LOS ANGELES · CALIFORNIA

*A 2/12/42*  
February 11, 1942

Mr. G. M. Colvocoresses  
1102 Luhrs Tower  
Phoenix, Arizona

Dear Cal:

Since writing you yesterday I have had a talk with a friend of mine who for some little while has had the idea that it would be possible to make money off of the treatment of mercury ores provided sufficiently cheap treating equipment would be available. He has a type of equipment in mind which we shall check over on paper; maybe it will prove satisfactory and maybe it will not.

I told him of your interest in mercury mines, and he asked that I write you to find out whether your views about availability of ore are the same as his. He believes there are quite a few partially developed mines which could produce from ten to twenty tons of ore per day, averaging from one-half per cent to one per cent mercury. Furthermore, he believes a good many properties have enough ore in sight, or actually blocked out, or on the dumps, of this average grade sufficient to last for a year on a ten-ton per day basis; namely, three to four thousand tons per mine. I told him he was right optimistic in this latter assumption.

What do you know about the mines in Arizona, looked at from this point of view?

What my friend has in mind is to get together a group of men to form a small company, syndicate or partnership, depending upon which would be best under our present laws. This group would go to the mine owners and make a dicker under which the miner would deliver the ore to the plant, which would be constructed and operated by this syndicate. The miner would take full responsibility for his end of the work and the syndicate would take full responsibility for the plant. The recovered mercury would be divided fifty-fifty. Of course, such an arrangement is only feasible provided the miner is up against it for a place to

February 11, 1942

ship his ore, and further provided the plant can be built so cheaply that it can be dismantled and moved elsewhere as soon as the delivery of ore is terminated for one reason or another.

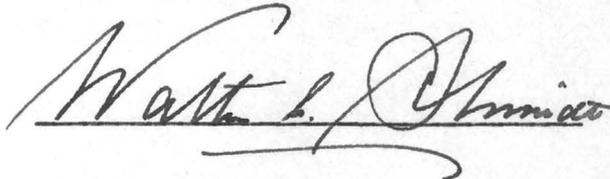
My friend's idea is that the plants cannot cost more than \$10,000.00 at the outset and that about five of these should be started in different localities. This would call for a working capital of something over \$50,000.00.

Of course, this is all a war baby idea. Present prices make a one per cent ore worth fifty dollars per ton and if such ore were available, a ten-ton plant would have a turn-over of approximately five hundred dollars per day, which would amortise a \$10,000.00 plant in short order.

Of course, you and I know from past experience that there are many rumors of mines that have been abused and gutted and that with proper development work, valuable ore reserves could be determined. Then, when one gets to work in these mines, it is found the rumors were based on hopes and not on facts. As mercury deposits are usually very spotty, this general statement may be even more true with mercury mines than with other mines. Furthermore, in connection with this particular setup, mine development would be left out completely. The group would merely make treating equipment available to the miner at his property. If the miner could not bring out enough ore to make it pay, the equipment would be taken away and moved elsewhere.

What do you think about the idea and what do you know about the availability of ore?

Sincerely yours,

A handwritten signature in cursive script, reading "Walter A. Schmidt". The signature is written in dark ink and is positioned below the typed name. The signature is somewhat stylized, with a large initial 'W' and a long, sweeping underline.

Walter A. Schmidt      jw

April 17, 1943

Talk with William Reynolds, owner, who has now taken the property back from recent lessees, the B & B Co. (Ball and Barnes) and has clear title.

Reynolds present address: c/o Dick Robbins, Box 64  
Scottsdale  
or can be gotten on phone c/o Cady at Hayden Guest Ranch, Tempe.  
Reynolds will give bond and lease for \$75,000.00 purchase price with cash payment of \$5000.00 after examination to cover cost of equipment etc. and 10% royalty with minimum payments of \$5000 every six months.

(These terms might be substantially modified.)

Property consists of 13 unpatented claims with plenty of good water and camp buildings are one boarding house 16' x 24' and tent house 14 x 14. Road is now fair right up to mine and road distance from Bush Highway at Mt. Ord Mine is 9 miles but only a little over 3 miles in air line.

Equipment consists of 3 drill compressors and some tools. Last operators put in a 4 tube retort furnace which they burned out and had no money to replace.

Old workings of mine described in U. of A. Bulletin #122 p. 93. and since then shaft was sunk to depth of 100' but is now caved. An adit crosscut was driven at 125' below collar of shaft and most of the ore stoped up to the 75' level but above the adit there are still several thousand tons of pay ore left in place. (This is probably an exaggeration).

Ore occurs in sericite schist along a contact with basic intrusive rock (perhaps diorite) which can be traced for length of some 2000'. The mineralized zone in places is 20' wide but most of this is very low grade and the pay streak in vicinity of shaft and adit has width of 8" to 4' and will average 0.5% Hg. Similar ore

Mercuria Mine

#2

left at both ends of the drift which is 75' long and along the floor where it could best be developed by sinking a winze or a new shaft.

Total production of mine about 100 flasks and last operators gouged out and shipped nearly 12 flasks which were sold to Metals Reserve Corp. (Snow in Phoenix) for \$2256.00. Full flask (76#) now sells at \$196 to \$198 on open market or \$2.58 per pound.

Near to the Mercuria the Mt. Ord Mine is developing well with help of Govt. loans and opening up a lead for 1000'. They have a Gould furnace in operation.

Pine Mt. Mine has sunk 300' below the old adit which I sampled and vein is 7' wide and carries very good ore. Reynolds says that they have produced ore with value of \$500,000 in last few years and owners have made a large profit.

Reynolds may be going up to mine soon in which case he will phone and I might drive up with him to return that same evening.

Ore containing 0.5% Hg would have a gross value of \$25.80 per ton and current development, mining, treatment and marketing costs and losses should not exceed \$10.00 per ton. If Reynold's statements are correct this might be a worth while "war baby".

*Copy sent Walter S. 4/20/43*

*He is not interested*

April 17, 1943

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## REPORT ON PINE MOUNTAIN MERCURY CLAIMS

This property I visited in November of 1930 with Mr. W. M. Gohring, and again on October 31, 1931 with Ted Myers. Charles McFarlane, associated with the owners, accompanied us on both trips. I have also visited certain other properties in the district, particularly the Sunflower Mine and the Mercury Mine of Arizona and since these have been developed and operated to a considerable extent suggestive information was obtained from their inspection. I have studied reports on Pine Mountain made by Gohring and Carl Lausen, of the United Verde Copper Company and the report on the district issued by the Arizona Bureau of Mines, Bulletin No. 122 and have seen the results of samples taken by Bedford, Beckwith and other Engineers. I have availed myself of all of this data in preparing this report.

### PROPERTY AND LOCATION

The Pine Mountain property consists of eighteen unpatented claims located on the southwest slope of Pine Mountain in the Mazatzal range Northeast corner of Maricopa County, Arizona. The owners are W. D. Boardman (two-thirds interest) and Wm. Reynolds (one-third interest) both of Payson, Arizona.

The nearest railroad point is Globe, eighty three miles distant and from Globe the property is reached by following the State Auto Road (Globe to Payson) for sixty six miles, then a rough County road along Slate Creek for twelve miles and a burro trail up Sycamore Creek for five miles. The present cost of transporting supplies from Globe to Pine Mountain may be figured at about \$30.00 per ton.

9 The elevation of Pine Mountain Camp and mine workings is about 5,300 ft. and the Country is very rough with steep contours. There is no timber of value except some small cypress, but a very dense growth of brush covers all the surface and makes travelling and prospecting extremely difficult. The Camp consists of two tents near a small spring of good water. There is no mining equipment and all previous work has been done by hand steel, since removed.

### GEOLOGY AND ORE OCCURENCE

The formation of these claims and of the district in general is largely pre-Cambrian, sericite-schist of brownish color with bands of redish slate. The strike of these sedimentary rocks is northeast-southwest. The dip is to the northwest at an angle of about 50 to 60° except in the folds and crushed zones which are numerous. These rocks have been intruded by irregular masses of rhyolite porphyry, also schistose in structure, and locally by a rock which appears to be a species of tufa.

The cinnabar, together with quartz and calcite have been deposited by mineralizing solutions both in schist and porphyry. Generally the cinnabar occurs as minute particles disseminated thru limited areas of rock which will carry from .01 to as much as .1% Hg. The richest portion of these deposits is usually found in the porphyry where the cinnabar occurs as a thin film (locally termed paint) in the bedding places of the rock or in tiny seams and veinlets forming pockets of ore which will average .25% Hg. or better. The extent of these pockets at Pine Mountain has not been determined but at the Sunflower and Mercury Mine many of them have been worked out and as far as I could see or learn none had an extent of more than 100 ft. in length, 30 ft. in width and 200 ft. in depth. The average size was much smaller and the occurrences of these pockets is erratic and comparatively infrequent.

### DEVELOPMENT WORK AND ORE BODIES

Three areas of low grade mineralization are apparent on the surface at Pine Mountain and very likely there are others not yet discovered.

AREA ONE is located in a tongue of porphyry near the Camp site and Lausen gives it a length of 350 ft. along the strike (north-east-southwest) and a width of 30 ft. This is developed by surface pits and the tunnel where Lausen took four samples which averaged less than .03% Hg. A little further north another showing 15 ft. wide is developed by a surface cut which shows .016% Hg. I did not sample this showing as Lausen's work may be considered absolutely

reliable and only occasional specks of cinnabar are to be seen in the rock.

AREA TWO is located in porphyry on the north side of the Creek directly West of Number 1, about 1600 ft. Mineralized rock is shown here in several pits and in a surface trench made by Lausen where samples over a width of 52 ft. showed an average grade of .025% Hg. Lausen gives this showing a length of 225 ft. and an average width of 35 ft.

Other samples taken by the owners and by Beckwith, Bedford and Gohring confirm Lausen's results or in some cases show a higher grade, but do not indicate the presence of any commercial ore.

AREA THREE is the most important and the only partially developed portion on the property. It occurs in a mixed-up formation of schist, porphyry and tufa about 600 ft. south of No. 2 and on the south side of a steeply sloping ridge rising from the Creek. Just south of the summit of this ridge there is a cut in which a little low grade material was noted and samples were obtained by Lausen and others showing from .02% Hg. to .05% Hg. This represents the out-crop of what may be termed the south vein which has not yet been reached in any of the underground development work.

About 500 ft. to the North of this is noted the out-crop of the north vein which has been cross-cut by two adits. The upper adit is driven about 250 ft. below the crest of the ridge, the lower adit some 80 ft. below. The length of this mineralized area, according to Lausen is not over 200 ft. but he may have under estimated. It's width in the upper tunnel is placed at 125 ft. and is as yet undetermined in the lower tunnel. Lausen carefully sampled the upper tunnel in 5 ft. sections throughout it's entire length, namely, 120 ft. and he obtained an average of .110% Hg. For a width of 25 ft. (from 70 to 95 ft. from the portal) the tunnel averaged .314% Hg and one 5 ft. section shows .504% Hg. Myers recently sampled the best 15 ft. of this tunnel and obtained .73% Hg which is considerably higher than Lausen. After Lausen left the property in September 1927, the tunnel was advanced to a total length of 224 ft. from the portal, the ob-

of this being to eventually reach the downward extension of this south vein, but this vein, (allowing for the dip) appears to lie over 100 ft. beyond the present face of the tunnel. From 120 to 224 ft. the rock is hard blocky porphyry and tufa and appears to be entirely barren of values.

The lower adit now 90' long was run in for 70 ft. in 1928 and 1929 by the Mercury Mines of Arizona and by the Chase Mining Company who held successive options on Pine Mountain and the last advance of 20 ft. was made in September of 1931 by the owners of the property.

The first 55 ft. of this tunnel is largely in schist and tufa and does not appear to contain anything more than traces of mercury, but from 55 ft. onward the tufa cuts into porphyry and a higher mineralization is noted. In 1930 Gohring and I took three samples in 5 ft. sections beginning at 55 ft. and on the occasion of my last visit Myers and I took four samples in 5 foot sections covering the last 20 ft. of the tunnel and a fifth sample representing the present face which appeared to show a much better grade of ore. Results of these samples are as follows:

Section of Tunnel from portal --

55' to 60'	=	.095% Hg
60' to 65'	=	.53 % Hg
65' to 70'	=	.17 % Hg
70' to 75'	=	.04 % Hg
75' to 80'	=	.02 % Hg
80' to 85'	=	.05 % Hg
85' to 90'	=	.13 % Hg
and face	=	.62 % Hg

The material found from 55' onward appears to represent the downward extension of the south vein which is found in the upper tunnel at from 60 to 90'. It can, therefore, be stated that both the width and grade of this ore shows some improvement in the depth intervening between the adits and justifies the hope that a larger and better body of ore may be found below the second adit. Unfortunately this second adit is run on the level of the Creek so that no further exploration would be possible in depth except by resorting to a winze or shaft which, under local conditions, would be a very expensive procedure.

ECONOMICS OF THE PROPOSITION

Gohring, who has been familiar with this property for the past four years, believed that there was a possibility of developing at Pine Mountain a very large area of disseminated ore which might average .2 or .25% Hg and which by the application of methods similar to those employed in mining the Porphyry Coppers could be worked with a substantial profit. While it is impossible to definitely criticize this opinion without first conducting an expensive exploration by drilling and other methods, the results of all examinations seem to indicate that each of the mineralized zones is comparatively limited and surrounded by large areas of barren rock and that the average grade of even the mineralized portions near the surface does not exceed .1% Hg. There are as yet no indications of the existence of any large body of higher grade ore at greater depth. Moreover, I do not believe that it would be possible to work .25% Hg ore with any profit or to obtain working costs comparable to those of the Porphyry Coppers unless and until a railroad had been built for 80 miles from Globe to a point on Sycamore Creek just below Pine Mountain. In addition to this enormous expenditure, a great amount of development and equipment would have to be provided so that the total preliminary cost involved in any such operations as Gohring contemplated would run into many millions of dollars and seems absolutely prohibitive from all present evidence and indications.

The theory of some other Engineers and of the owners of the property has been that the higher grade ore shoots could be mined on a comparatively small scale (as at the Sunflower and Mercury Mines) and that a profit could thus be made in working ore which would average better than .5% Hg. They believe that the comparatively low values shown on the surface and in the upper tunnels will increase with depth and that a substantial tonnage of 1% or better ore will be developed at greater depth. I agree that the grade of the surface ore is likely to improve with depth, but I have seen no evidence that any substantial tonnage of high grade material is likely to be developed at Pine Mountain or anywhere else in this district. The very similar surface

showings at the Sunflower and Mercury Mine all proved to overlie ore shoots or pockets of very limited extent and while portions of these shoots produced 3% and even better grade of ore, the average output of these mines has been in the neighborhood of .3% and the search for and development of these small pockets and shoots has been so expensive as to render the operations unprofitable. Altho a considerable production is credited to both of these mines and a smaller tonnage to several other neighboring properties, yet (with the possible exception of the small Chris. Martin Mine) there is not a case on record where the net returns have repaid the development, mining and treatment costs and the initial investments aggregating several hundred thousand dollars have been a dead loss as far as I can gather. There is nothing in the present showing at Pine Mountain which leads me to believe that the future record of this property would be substantially different from the past record of these neighboring mines, altho this opinion might be revised by subsequent development. In any event, it is certain that the preliminary expense at Pine Mountain will be very high and I tabulate below, certain items of cost which would have to be met before the mine could ever be put on a producing basis, assuming that the furnacing of the ore would be carried on at a suitable location on Sycamore Creek, some four miles away from the mine and to which point the ore could be transported by a gravity rope-way.

Truck road to property, 5 miles at \$7,000 per mile .....	\$35,000
Camp buildings, pipe line, etc. ....	5,000
Mining and shaft equipment including power plant for development only .....	25,000
Sinking shaft to depth of 500' including pumping & timbering .....	50,000
Drifts, cross cuts, raises, etc., on 5 levels .....	75,000
Additional mine plant and power plant for regular operations .....	30,000
Rope-way to furnace site .....	35,000
Furnace and accessories .....	60,000
Miscellaneous .....	<u>10,000</u>
T O T A L	\$325,000
Add purchase price . . . . .	<u>75,000</u>
TOTAL INVESTMENT	\$400,000

An expenditure of this order might permit the property to operate on a basis of 50 to 60 tons per day and the working cost might be estimates as follows:

	<u>Per ton</u>
Mining, including development in ore . . . . .	\$5.50
(Lausen estimated \$6.00 and cost of mining and transportation at Mercury Mines is given me as \$6.50)	
Crushing and transportation to furnace . . . . .	1.00
Furnacing . . . . .	1.00
Selling and general expense . . . . .	<u>.50</u>
T O T A L	\$8.00

With mercury selling as at present at about \$1.00 per pound and a recovery of 95% the profits per ton of ore would be as follows:

Grade	.5% Hg
Value per ton	\$9.50
Profit	\$1.50
Grade	.1% Hg
Value per ton	\$19.00
Profit	\$11.00

Assuming as a possibility that the development outlined above should prove two shoots of ore respectively in the north and south veins, each having a length of 200' an average width of 20' and a depth of 500' we should have a total ore reserve of approximately 320,000 tons. The net profit, which might be expected from mining and treating this ore after deducting the initial investment of \$400,000 would be \$80,000 in the case of an average grade of .5% Hg and \$3,120,000 if the ore should average as high as 1%.

It appears to me that the risk involved in developing this property would only be justified in case there appeared to be good reason for believing that an average grade of 1% ore could be mined from this property and as noted above, this is from 3 to 4 times as rich as the average ore produced by any of the other mines in this district. Moreover, no one of these other mines has produced any such tonnage nor, so far as I can learn, has this been turned out by the entire district to date and none of the ore shoots have so far proved continuous to a depth of 500 ft. so that

the chances of developing any such ore bodies at Pine Mountain appear exceedingly slim.

CONCLUSION

I consider that the present showing in the lower tunnel at Pine Mountain is encouraging and should lead the owners to continue their exploration at least to a point where they have delimited the extent of the fairly high grade material now showing in the face of the adit. Should this work prove up a substantial area of 1% or better ore, other parties might then be justified in taking a lease and continuing the development provided, but only provided, that no cash payments were required by the owners for a period of at least a year. Even on this basis I do not consider that the new comers would be engaging in an attractive mining venture except on the theory that they might be able to dispose of their interest to other parties at some profit.

In view of the terms of payment which are asked by the owners or any modifications which they would be likely to accept I must unqualifiably condemn the entire proposition and recommend no further action or expense in connection therewith.

Yours very truly,

(signed) G. M. Colvocoresses

GMC:HG  
Phoenix, Arizona.  
November 17, 1931.

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MAZATZAL MOUNTAINS MERCURY DEPOSITS

In the Mazatzal Mountains, North of Roosevelt Dam, there is a wide spread showing of mercury mineralization.

Although there has been considerable development in the district on two properties, this is really an undeveloped and unexplored field as the two properties which have been worked are probably six miles apart and there has been very little prospecting in the back country between them, except by one or two men who have found and done a little work on cinnabar showings in various places which indicate that there is cinnabar over an area six or seven miles long, at least, and several miles wide.

I have been particularly interested in one property on which I now have an option. This is a group of twenty claims along a schistose-quartz-porphry belt, very uniform in character, and apparently carrying cinnabar and metallic mercury throughout its width of something over 200 feet. A tunnel driven into this for one hundred feet is the most extensive piece of work that has been done. This tunnel has been carefully sampled and shows an average, throughout, of 0.11% mercury, with thirty-five feet running 0.257% mercury, and individual samples running up to one-half percent, these being the figures from the lowest of the several different samplings. At various places on the property open cuts and pits show the cinnabar to be wide-spread in its occurrence and I have obtained assays of better than one-tenth percent, over a wide area directly on the surface. In panning the rhyolite, in its densest portions, it is remarkable to see what strong concentrates one gets in both metallic mercury and cinnabar.

Judging from this tunnel alone, I do not doubt that one could sort out enough tonnage to maintain a small operation by sorting out ore of better than three-tenths percent, but my own interest in the property is in the possibility of operating a plant designed for treating a large tonnage of low grade ore, much along the lines of later day developments in copper. I do not see why, with the same class of technique that has developed the treatment of low grade copper ore, both in the mining and metallurgical ends, we could not develop the mercury business along the same lines and I believe that there is plenty of room in this district for investigating this possibility and, almost certainly, plenty of tonnage.

The development of this particular property I speak of could be cheaply done by diamond drilling. I have an estimate already showing that two thousand feet of drilling, which I estimate is enough to tell the preliminary story, could be done for \$6,000.00. I do not think I would want to go into the business on an extensive tonnage scale on ore of 0.1% but with that on the surface I believe the drilling of this property is justifiable, in the hope of finding a better average grade in depth. The whole country is made up of a uniform sheared schistose zone, dipping about 70 degrees and there is no reason why the values should not go to considerable depth.

In addition to the cinnabar showings I mention, my friends who have prospected this region have discovered other zones in the schist carrying cinnabar but, as there is practically no real development, it is impossible to say what they will amount to. I know of several places where you can see up to three feet wide of good looking cinnabar ore.

(Signed) By:- W. M. Gohring.

1930 (3)

UNITED VERDE COPPER COMPANY  
Jerome, Arizona

September 2, 1927.

REPORT ON THE PINE MOUNTAIN CINNABAR COMPANY

LOCATION

60 The property examined is situated in the Mazatzal Mountains near the northeast corner of Maricopa County; and the extreme northeastern end of the claims is only a few thousand feet from the Gila County line. The property is approximately 75 miles from Globe, the nearest shipping point, from which supplies can be obtained. An automobile road up Slate Creek with a length of eleven miles branches off the main Globe-Payson Highway near the mouth of Slate Creek. Where this road crosses Red Rock Pass over the Mazatzal Mountains a good trail, five miles long, leads to the property of this company. Supplies must be transported at present over this trail on pack animals.

OWNERSHIP

The Pine Mountain Cinnabar Company owns a group of nineteen (19) unpatented claims held by location under the Federal and State mining laws. This company is controlled by Wm. P. Boardman, Wm. Reynolds, and Chas. McFarlane, all of Payson, Arizona.

GENERAL CONDITIONS

This group of claims is in a rough country of rugged topographic relief. At the lower, or southwest end of the claims, the elevation is 4,500 feet above sea level; and those claims beneath the rim of Pine Mountain attain elevations of somewhat over 6,000 feet above sea level. The region is one of nearly parallel northeast ridges, with deeply incised canyons between.

A heavy growth of brush covers these steep slopes and makes travel through this country, except along established trails, nearly impossible. Oak brush and manzanita are most frequently seen, but several other species of chaparral were noted. Here and there are scattered scrub oak trees, but they are always small.

Camp facilities are entirely lacking, although an excellent site, near springs, is available on either of the two main streams traversing this property.

TIMBER

Along the creek bottoms a small stand of Arizona Cypress is nearly always present. These stands are usually in sheltered spots where the winter snows melt late in the spring. Most of this type of wood is a slender sapling useful only for domestic purposes, but here and there are scattered larger trees which often attain a diameter of twelve inches or more. Arizona Cypress, when cut green and stripped of its bark, will make excellent mine timber. Occasional single trees of the Western Yellow Pine were noted on this group of claims, and on the higher, southwest slopes of Pine Mountain this species of wood is fairly abundant. Scrub oak trees rarely show a diameter of six inches and is valuable chiefly for domestic purposes. When the Arizona Quicksilver Corporation was operating on Alder Creek, to the west of this

group of claims, oak wood was used as fuel in heating a 12-pipe retort, and I was informed by McDonald, then in charge of operations, that the minimum time required to heat the charge was thirteen hours. Such oak wood was allowed six months to cure.

The cost of collecting oak from this group of claims will be found to be prohibitive, chiefly because of the dense undergrowth and the rather scattered distribution of desirable wood.

#### WATER

A small flow of water issued from springs in both creeks and, if piped to galvanized iron storage tanks, would suffice for domestic purposes for a small camp only.

Sycamore Creek crosses the lower end of these claims and, during the rainy season, contains an abundance of water, but this stream has been known to dry up entirely some years, and an adequate supply of water for leaching purposes, therefore, is not assured.

This is a region of pre-Cambrian schist - a formation that almost invariably is tight, and sufficient water cannot be developed by underground operations.

#### GEOLOGY

The formation on this group of claims is a pre-Cambrian schist. The prevailing type is a brown slate. The strike of the schistosity is northeast and varies locally from 45° to 60° east of north. The dip of the schistosity is always steep and to the north, except where slumping, due to surface creep, has changed this prevailing dip.

Invading these slates are irregular intrusions of rhyolite porphyry which also are schistose in the smaller masses and along the borders of the large one. In these schistose masses of rhyolite porphyry cinnabar has been deposited by mineralizing solutions.

Cinnabar was deposited as minute particles disseminated more or less throughout the body of the rock. In certain cases, especially in the rich portions of the lode, minute veinlets traverse the schistose rhyolite porphyry. Some areas of mineralization contain small, nodular masses of calcite which is the gangue mineral accompanying mineralization, and in them cinnabar is frequently found. Metallic quicksilver was noted in specimens from the No. 1 Tunnel, and, as there is no visible evidence in the specimens of the surface oxidation due to downward, percolating solutions it is possible this mercury may be primary in origin. The amount present is small.

#### AREAS OF CINNABAR DEPOSITION

Three separate areas in which cinnabar has been deposited occur on this group of claims. These areas are designated by numbers on the geologic map accompanying this report.

##### Area #1:

Cinnabar occurs in a tongue of schistose rhyolite porphyry extending from the No. 1 Tunnel in the southwesterly direction almost to the bed of the creek. By panning specimens of this rock a string of colors could easily be obtained, showing that cinnabar is present in this rock for a distance of at least 200 feet. The material, however, appears to be very low grade and I am not absolutely certain that it is continuous through this distance.

A test panning was made on the reject of sample #21 from the tunnel. A good string of colors was obtained, although the assay return showed the material to contain only 0.038% mercury. I believe it would be possible by panning to definitely determine the presence of cinnabar in rock as low as 0.02% mercury.

Development work consists of a tunnel 122 feet in length, and the direction is S 38° E. A careful channel sample was cut along this tunnel at five foot intervals. The assays on these samples are as follows:

Sample No.	Distance Ft.	% Mercury	Character of Ground
1.	0 - 5	0.124	Oxidized at portal
2.	5 - 10	0.030	" " "
3.	10 - 15	0.048	" " "
4.	15 - 20	0.048	Somewhat oxidized
5.	20 - 25	0.030	" " "
6.	25 - 30	0.076	" " "
7.	30 - 35	0.030	Partly altered
8.	35 - 40	0.044	Hard, brittle
9.	40 - 45	0.056	" "
10.	45 - 50	0.034	" , tough
11.	50 - 55	0.088	" "
12.	55 - 60	0.070	" " , blocky
13.	60 - 65	0.130	" "
14.	65 - 70	0.096	" "
15.	70 - 75	0.416	" "
16.	75 - 80	0.190	" "
17.	80 - 85	0.194	Tough, splintery
18.	85 - 90	0.504	" "
19.	90 - 95	0.266	" "
20.	95 - 100	0.040	" , brittle
21.	100 - 105	0.038	" "
22.	105 - 110	0.056	" "
33.	110 - 115	0.024	" "
34.	115 - 120	0.014	" "

25 @ .314

{

Major depth 15'

@ .73

The average assay value of this tunnel is 0.110% mercury. A richer portion of the tunnel is represented by Samples 13 to 19, inclusive. This streak is 35 feet wide and averages 0.257% mercury.

In this tunnel the strike of the schistosity is N 50° E, and the dip is 60° to the northwest. To determine the width of the mineralization to the northwest a few small cuts were made on the slope below the tunnel. The contact of the slate with the rhyolite porphyry was found to be within a few feet of the portal of the tunnel, and the dip of this contact is to the north at 60°.

To the east of the portal only rarely can specimens be found containing cinnabar, and the mineralization in this tongue probably does not extend over 200 feet in an east-west direction. With a width of 125 feet and an average height of 50 feet, the tongue in this block would be:

hij

$$\frac{200 \times 125 \times 50}{12.5} = 100,000 \text{ tons.}$$

Over the crest of the hill, above this tunnel, a small cut shows some cinnabar on panning. A sample, No. 35, taken over a width of seven feet assayed 0.114% mercury.

Area #2:

Mineralization here is also in a mass of very schistose rhyolite porphyry with a general northeasterly trend. The maximum width of this mass of rhyolite porphyry is nearly 200 feet, but here it appears to be barren as colors could not be obtained on panning surface specimens.

Several small cuts had been started toward the eastern end where the intrusive mass narrows, and under my direction a trench (marked Cut #2) was made across this area for a distance of 57 feet. The last five feet, near the upper slate contact, appear to be absolutely barren. The remaining 52 feet were carefully sampled and the assay returns on these samples are as follows:

<u>Sample No.</u>	<u>% Mercury</u>	<u>Width of Sample in Feet</u>
36	0.082	10 ft.
37	0.030	10 "
38	0.004	10 "
39	0.002	10 "
40	0.010	12 "

The average value of the rock in this trench is 0.025% mercury.

The length of the mineralized ground is at least 225 feet, and the average width is 35 feet. Rather soft, brown slate will be found in both the foot and hanging walls, and the dip of the intrusive mass will be 75° to the north below surface slumping. Should the mineralization be continuous both laterally as well as in depth, this mass will yield, on mining, approximately 60,000 tons of material for every hundred feet of depth.

Area #3:

This is near the present camp site. Here the intrusive rhyolite porphyry splits into two branches, and one of these stops very abruptly a few feet northeast of cut #5 (shown on map). Between these two dikes is a belt of slate 40 feet wide.

Mineralization does not extend far along the strike of the upper dike on which cut #5 is located. The width is 15 feet and a sample of the cut assayed as follows:

Cut #5 - 0.016% mercury - Width, 15 feet.

In the lower dike the mineralization is continuous for 350 feet along the strike. Tunnel #2 was run in 65 feet to cut across this dike. Mineralized rhyolite porphyry was passed thru from 35 feet to 65 feet (the face) from the portal. The bearing of the tunnel is N 73° W, and the strike of the schistosity is N 70° E, so that 7.5 feet along the tunnel is equivalent to five feet across the formation. Four samples were taken in this tunnel and the assay returns are as follows:

<u>Sample No.</u>	<u>% Mercury</u>	<u>Distance in Ft. From Portal</u>
29	0.022	35 - 42.5
30	0.024	42.5 - 50
31	0.025	50 - 75.5
32	0.036	57.5 - 65

This tunnel has not passed through the entire width of mineralized porphyry which is here estimated to be 50 feet wide. The average of the four samples is 0.027% mercury and represent 20 feet across the formation.

Under my direction a trench was made across this dike about 100 feet to the northeast of the tunnel. The length of the trench was 43 feet. Four samples taken in this cut assayed as follows:

<u>Sample No.</u>	<u>% Mercury</u>	<u>Width in Feet</u>
24	0.014	10
25	0.070	10
26	0.004	10
27	0.054	10

The average of these four samples is 0.036% mercury.

Between the trench and #2 tunnel a cut (marked #7 on the map) was sampled over a width of seven feet. This sample (#28) yielded 0.050% mercury.

With a length of 350 feet and an average width of 35 feet, the mineralized area in the lower dike will yield approximately 100,000 tons of material for each 100 feet of depth.

#### MINING METHODS APPLICABLE TO THIS DEPOSIT

Mr. Boardman informed me that W. B. Gohring suggested steam shoveling as the best method suitable to this deposit. The steam shovel could be used only on Area #1, and then only until the level of the creek is reached. To this level very little stripping of the overlying brown slate would be necessary, but after this level is reached a large amount of barren material must be removed, and the cost of mining by this method would be prohibitive.

The size of the deposit and the nearly vertical dip might lead some to attempt a shrinkage stope, but the soft character and schistose nature of the slate would cause it to slough readily, causing a dilution of material already of very low grade, and this would preclude this method of mining.

A cut and fill method of mining seems most adaptable to this deposit. The schistose nature of the rock would probably make it possible to open large stopes with little danger of losing them due to collapse of the roof. This would require but little timber.

In a preliminary report on this property, Mr. Quale estimated the minimum cost of mining at \$6.00 per ton. This deposit will not stand such a charge.

#### TREATMENT OF QUICKSILVER ORES

In the higher grade ores, where only a small tonnage is mined, the 12-pipe retort has been found satisfactory. The minimum time of heating with seasoned oak wood was found to be thirteen hours by McDonald, formerly with the Arizona Quicksilver Corporation. The consumption of fuel is high.

The Scott 30-ton furnace was used for years in California on ores that ran less than 0.5% mercury. In recent years the rotary furnace has been tried, but I do not know what results were obtained.

During the World War experiments were conducted at the Berkeley Station of the United States Bureau of Mines on the flotation of the low grade cinnabar ores of California. It has been some time since I first learned of the results of these experiments, but my recollection is they showed very definitely that it was cheaper to furnace the ores direct rather than to separate the cinnabar by the more costly method of fine grinding and floating.

Leaching has been tried, but this method is still in the experimental stage. The metallic aluminum used as a precipitant after the quicksilver is brought in solution will be found expensive.

#### CONSTRUCTION OF ROADS

To reach this property with trucks will require the construction of from three to four miles of road, depending on the site selected for the plant. A 5-mile road built by the Arizona Quicksilver Corporation is said to have cost \$35,000. On the same basis the minimum cost of a road to this property from Red Rock Pass would be between \$20,000 and \$30,000. In addition, some road work would be required between the three areas of mineralization.

#### COST OF TRANSPORTATION OF SUPPLIES

It will be necessary to haul supplies from Globe, the nearest shipping point, at least 75 miles away. This would be an all-day journey for a truck because of the grades and winding roads. The cost of hauling supplies would probably be \$0.20 per ton-mile, or \$15 per ton. Fuel oil for furnace operations would be very expensive.

#### PRICE OF QUICKSILVER

Quotations on quicksilver are usually given in dollars per flask. Quicksilver has fluctuated between wide limits, and at present the price is abnormally high. The quotations in the Engineering and Mining Journal for the week prior to August 27, 1927, was \$118-1/2 to \$119-1/2 per flask of 76 lbs. On this basis quicksilver is worth \$1.56 per lb.

The average value of the #1 tunnel is 0.110% mercury. With 90% extraction this would amount to two lbs. of mercury per ton of rock treated, and which would have, at the present market price, a value of slightly over \$3.00 per ton.

All the other areas samples, as shown by assay returns, probably will never be commercial even with mercury at \$2.00 per lb.

#### CONCLUSIONS

The only area at this property showing material over 0.10% mercury for more than five feet of width is at the #1 tunnel. Even with steam shovel operations, the maximum quantity of mineralized rock that could be mined by this method without a great deal of stripping would be 300,000 tons. This might be increased somewhat by further development along the rhyolite porphyry-slate contact

The low grade of this material, as well as the small quantity that can be mined by some cheap method, shows that this property is not worth further consideration by the United Verde Copper Company.

In the #1 tunnel is a 35 foot streak that will average 0.257% mercury. This richer portion is too small to justify the construction of roads and plant, as the margin of profit is low.

Respectfully submitted,

(Signed)

Carl Lausen

Field Geologist.

## UNION OIL COMPANY OF CALIFORNIA

Wilmington, Calif. June 27, 1927.

Mr. C. R. McCollom, Chief Geologist, 419 Heard Bldg., Phoenix, Ariz.

Subject: HAND SPECIMEN CONTAINING  
CINNABAR AND NATIVE MERCURY

I have prepared slides and photographs as requested of the two hand specimens of Cambrian Schist from Arizona containing Cinnabar and Native Mercury.

Description of The Hand Specimen

The hand specimens consist of a dense, light gray, felsitic groundmass containing a small number of quartz phenocrysts, scattered crystals and incrustations of calcite and a considerable amount of disseminated Cinnabar, accompanied by a small amount of Marcasite and Pyrite. Distributed over the surface of both specimens are minute globules of Native Mercury. Figures 1-3, Plate I, show these globules on different portions of the area marked "A" on Sample No. 1.

Description of the Thin Sections

Two thin sections were prepared of Sample No. 2, one of the richer and one of the leaner material. After completion, both slides were found to be almost equally rich in Cinnabar and Native Mercury.

These slides show a micro-crystalline groundmass, the individual grains of which are indistinguishable, but which are evidently chiefly quartz. Scattered through the groundmass are a few large phenocrysts of quartz (Figures 1-4, Plate II. These large quartz crystals show numerous fractures. In addition to the quartz, calcite crystals were noted in the hand specimen, but no large ones were found in the sections made, although calcite is evidently present in the felsitic groundmass. The Cinnabar occurs both as fillings along the fractures in and around the large quartz crystals, and as disseminations throughout the groundmass, particularly along the planes of schistosity. Minute globules of

of Native Mercury associated with the Cinnabar are also visible in the thin section. Figures 1 and 2, plate III show a few of these droplets appearing as round black dots near the lower right hand corner. Marcasite, and Pyrite, likewise are present, but in considerably less amounts than the ore mineral. The former are hard to distinguish in the photographs from the Native Mercury and the Cinnabar. The irregular black patches in Figures 1 and 3, Plate III and Figure 3, Plate II, are Cinnabar and Native Mercury with associated Marcasite and Pyrite.

#### Classification and Origin

The hand specimens may be classified as a Mercury bearing Schistose-Quartz-Porphry. The thin sections show that the Cinnabar, together with the Marcasite, Pyrite and Calcite, has been deposited from rising solutions or hot springs, at the same time or subsequent to the development of the Schistosity. The association of Native Mercury with the Cinnabar is not uncommon and is discussed in most books on Economic Geology. The native metal has probably been derived secondarily by oxidation of the sulfide, although according to Lindgren (Mineral Deposits, 1919, p. 893) it is not impossible that some may be of primary origin.

Yours very truly,

W. A. RAINE, Manager  
Research and Development

By Stanley S. Winber

SAMPLES FROM PINE MOUNTAIN CINNABAR CO.

June 14 and 15, 1927.

Sample No.	Per Cent Mercury.	
1	.46	Specimens of White Rock from face of Lucky Day Tunnel, showing considerable Cinnabar.
2	.21	Same as No. 1 but picked as poorest. Shows almost no Cinnabar.
3	.38	Lucky Day Tunnel - specimens of brown oxidized material picked from dump.
4	.09	Lucky Day Tunnel - specimens of conglomerate rock.
5	.18	Lucky Day Claim - specimens from face of foot-wall cut near top of hill.
6	.06	Lucky Day Tunnel - Cut along tunnel wall in conglomerate.
7	.10	Lucky Day Tunnel - Cut along tunnel wall from 55 to 80 feet. Partly in brown material.
8	.16	Lucky Day Tunnel. Cut along wall for 18 feet back from face in White Porphyry Rock.
9	.16	On Pine Mountain No. 2 - from face of highest cut on hill above tent.

QUICK SILVER STATISTICS

	Per Flask	Per lb.	F L A S K S U.S. Production	U.S. Consumption	% Hg. in U.S. Ore	U.S. Ore Tonnage Mines.
1919	\$ 92.15	1.23	21,415	22,943	0.42%	
1920	81.12	1.08	13,392	26,008	0.46	
1921	45.46	.61	6,339	16,547	0.63	
1922	58,946	.79	6,375	23,004	0.51	
1923	66.502	.89	7,937	25,692	0.59	50,796
1924	69.761	.93	10,085	23,047	0.50	70,191
1925	83.128	1.11	9,174	31,751	0.50	65,378
1926	91.903	1.23	10,000	34,000		

Flasks = 75 Pounds.

ARIZONA MERCURY MINE.

Note by G. M. Colvocoresses,

November, 1930.

Six miles along the Bush Highway from the turnoff from the Payson-Roosevelt road and located on Slate Creek is the Arizona Mercury Mine, operated by the Mercury Mines of Arizona, of which L. E. Foster of Phoenix is President or vice President, and Louis P. May was Assayer and is now in charge. In this mine the cinnabar is found principally in the schist, although associated in some cases with quartz. It is said that this property was the largest producer of mercury in the United States during 1929. (?) The mine is well equipped with camp buildings, power plant, etc., and has a Foster Furnace which May considers superior to the Gould, since only five gallons of oil were used per ton and recovery is said to have been in excess of 99%. Ore was crushed to 5/8" and the Foster furnace has only flue chambers for catching the dust and no Cottrell equipment. The oil here cost 11¢ per gallon. This property was first developed by the Spitzers some five or six years ago with Henry Gould as consulting engineer and Bedford as Superintendent, but later Gould advised dropping this mine after some \$70,000 had been expended, but no furnace yet installed, and his people accordingly abandoned this property, which was later taken up by Foster, backed by Woolworth Company officials, and the Spitzers transferred their activities to the Sunflower mine.

The elevation at the camp of the Mercury Mines of America is 3200'. Beyond the camp, and at a distance of 11 miles from the Slate Creek Turnoff, the road on the way to the Sunflower crosses a divide at an elevation of 4180'.

At the Arizona Mercury Mine, one body of good grade ore was discovered and mined, averaging about .65% mercury per ton, although some of the ore which was sent to the furnace ran as low as .15%, but the grade was brought up by high grade stringers carrying several percent. Here also it is indicated that no large body of ore has as yet been properly developed and when this mine is re-

opened it will probably be necessary to first spend a considerable amount of money in development before a steady production of ore can be expected.

An inspection of the accessible workings lead me to conclude that here also as at the Sunflower and Pine Mountain mines the better grade of ore occurs only in pockets or small lenses, and unless a large amount of exploration and development is carried on along with the production the operators are continually running out of ore for the mill. The mine was shut down at the time of my visit and each company that has operated in the past seems to have ended up with a deficit so that I cannot feel too optimistic in respect to the future although there is always a chance that some larger or richer ore body may be found in the future.

This mine is also fully described under the titles of the groups of claims, Red Bird, Ord and Rattlesnake, in Bulletin #122. of the University of Arizona.

PINE MOUNTAIN CLAIMS 10/31/31

18 Claims on Group

TERMS

Cash Price \$75,000.00 - 75 days or of time wanted.

\$100,000.00 - 1 year time

5,000.00 - at end of 75 days

20,000.00 - in 90 days (~~after 2nd payment~~)

25,000.00 - in 6 months

25,000.00 - in 9 months

25,000.00 - in 12 months

At least 150 shifts per month, starting on or  
before November 10th, 1931.

W. D. Boardman

Cord '41,  
- ?

RE: SUNFLOWER MINE (ARIZONA MERCURY CO.) AND  
SADDLE MT. QUICKSILVER MINE.

V. O. Welch, the Manager, said to be a hop-head and property has suffered from mis-management.

Ore will average 7# per ton and is noted on surface and on 150' level in four veins which have widths of 6' to 12'. Three of these veins proved up in the mine workings.

Cord has dropped the Ord Mt. property as his development work gave negative results.

Shaft

Mine is working on the 150' level from the Packover/and the upper workings have been mined out.

Property presented by James F. Vassar, Phone Tempe 844, living at Hayden Ranch, Route 1, Box 21, Tempe.

Vassar claims that he can get option from owner who wants \$150,000 (too much) for property but might come down, lease would call for 10% royalty with minimum of \$1000.00 per month (also too much)

Equipment is mostly in good shape and not more than \$1500 would have to be spent to put mine in full operation. Should also have a working capital of \$5000 and in a couple of months Vassar says that operations could yield a monthly profit of \$10,000.00.(doubtful)

The owner would not tie up the property until optionee was ready to make a deal and then would give a four year lease, but the present leaser(Carpenter by name) would have to be bought out but Vassar says that he can force Carpenter to make a favorable deal and he (Vassar) would get a 10% commission from the owners and would not expect anything from the lease.

Examination of mine might require three or four days as four veins could be sampled on surface and 150' level but samples could be assayed at the mine.

Recent production has been from 10 to 20 flasks per month and from May to July 1941, 37 flasks were shipped but Vassar claims that this could be stepped up to nearly 200 flasks per month as equipment will handle 80 tons per day and make 85 and 90% recovery from ore that is already developed in large quantity and will average 6 to 7# per ton.

$80 \times .90\% \times 6 \text{ equals } \frac{432}{76} \text{ equals } 6 \text{ flasks per day or } 180$   
flasks per month (? as to Vassar's reliability and quantity of ore really developed)

Robert Saufley called and claimed that there is a very interesting situation in the Mazatzal Mercury District and an opportunity to pick up some of the developed mines such as the Sunflower, Pine Mt. and Slate Creek where recent operations have been badly misdirected and also that there are some promising prospects which could be taken over on a royalty basis.

Particularly mentioned a group of claims owned by Charles A. Ward (Atty. of Phoenix) who may write me about them.

Think this will bear investigating.

C  
O  
P  
Y

Prescott, Arizona  
September 15, 1931

Dear Mr. Anderson:

I received your letter yesterday as I just returned. I met a Mr. Harry Eckert, who is interested in a quicksilver property near Payson, I am sending you a description of the property as he gave it to me. While I have never been on the claims, I feel he has not misrepresented them, and from the looks of the ore, it is well worth looking into. I am sending three samples I got from Mr. Eckert, he says it is a fair average of the ledge formation. Will you have them assayed and please send me a copy of the returns. I was thinking Dr. Duschak would be interested in a proposition of this kind, and from all the data I can gather concerning this property, it is estimated to be the largest cinnabar deposit in the United States. One company is offering now to put up a two hundred fifty ton mill and operate on royalty terms, but Mr. Eckert is anxious to get a down payment before work by mill is started.

I was thinking if you would send Dr. Duschak a copy of the returns from the samples, also the typed description of the claims, it would give him an idea of the property, and he could let you or myself know if he is interested. If he should want, I will gladly go down and personally sample the claims, and give him a written report on the property as I see it. This, I think, is a big proposition, and will not go wanting very long. I will gladly send any more data wanted and will help in any way possible. I sent you a specimen, also one for Dr. Duschak. Eckert claims there is a five inch stringer of this ore cutting through the schist.

In reference to the burnt shale, mentioned in your last letter, the shale I referred to is exactly where you described it, just across the creek from the N.T.V. dump at the old crusher. The other is a small deposit located between the tunnel and old mill on the diatom property.

Hoping all is well with you and to hear from you soon,

Yours very truly,

Ted Myers,

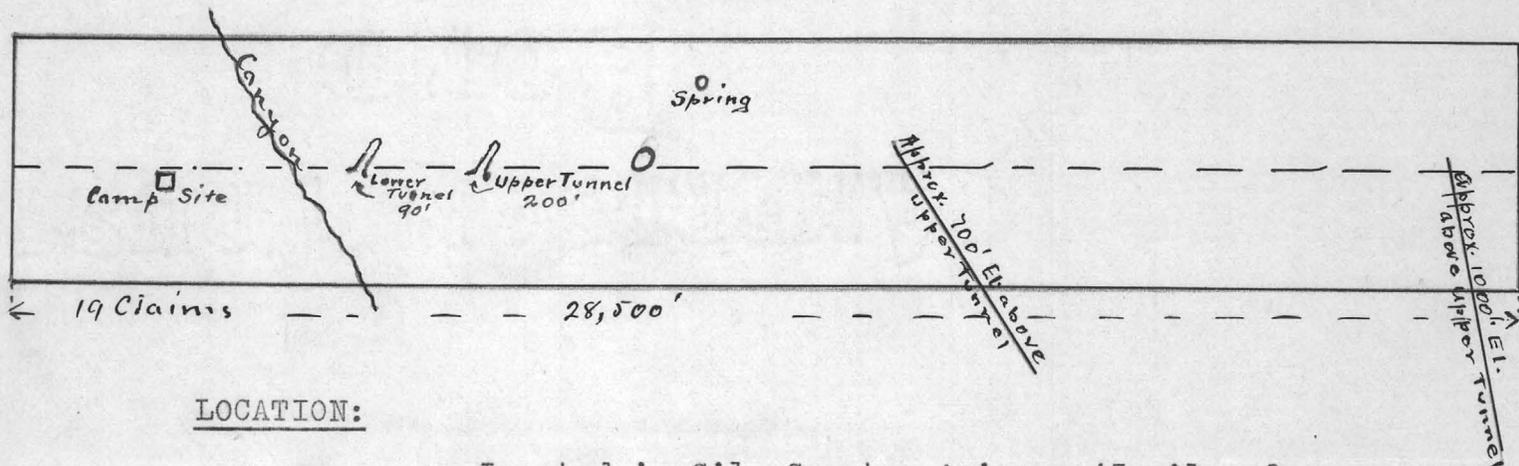
Box 238 - Prescott, Arizona.

02:IM

PINE MOUNTAIN

CINNABAR MINES,

PAYSON, ARIZONA



LOCATION:

Located in Gila County, Arizona 45 miles from Payson, good road. Seventy-five miles from Globe, Arizona. Payson is 104 miles from Prescott. Can drive to within five miles of property.

TITLE:

Property was located and records are clear and assessment work is up to date.

WATER:

Sufficient water supply upon property for all necessary needs, such as retorting, milling and domestic purposes. Can be piped by gravity with 600 feet of pipe to mill and camp.

TOPOGRAPHY:

Located in a mountainous country. Dyke is continuous for 28,500 feet. Beginning at the south end, it is a continuous rise into a mountain with an estimated elevation of 1000 feet to 1500 feet above the south end of the property, and approximately 1000 feet elevation above the upper cross cut.

FORMATION:

The formation is of schist, porphyry and slate. Slate is found on the hanging wall and schist on the foot wall. With vein structure of rhyolite and porphyry in between. Dyke will average approximately 160 feet wide.

DEVELOPMENT:

Two hundred feet cross cut running at an angle across dyke, approximately two-thirds distance from the north end, known as upper tunnel. Ninety foot cross cut, to cut vein 100 feet deeper than upper

tunnel known as lower tunnel. Each claim is opened by cuts and trenches and is proven the entire distance of 19 claims to contain cinnabar.

ASSAYS:

Upper tunnel, 200 feet. 200 foot cut on side divided into 15 to 25 foot sections, gave low .31 per cent; high 4 per cent. This was done by popping and using gad and hammer.

Lower tunnel, 90 feet. Will assay from portal to face. 12 feet from face, average .75 per cent. This cross cut is being driven at this time by one man and is still in ore of the last 12 feet.

The price of this property is \$125,000.00 two years time. \$16,000 down and the balance as agreed upon at the time of signing papers. 10 per cent royalty allowed and to apply on the purchase price.

For cash the price is \$90,000.00 to be paid upon or before 90 days. 30 days will be allowed for examination.

Yours very Respct.

Harry J. Eckert.

September 15, 1931.

Prescott, Arizona

Box 1081.

O2:IM  
Sept. 18, 1931.

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WESTERN · PRECIPITATION · COMPANY ·  
CHEMICAL ENGINEERS

MAIN OFFICES AND LABORATORIES  
1016 WEST NINTH STREET  
LOS ANGELES, CALIFORNIA

October 22, 1931.

Via Air Mail

Mr. G. M. Colvocoresses,  
1108 Luhrs Tower,  
Phoenix, Arizona.

a. 10/23, '31

Dear Cal:

Your air mail package of papers, regarding the Pine Mountain cinnabar mine, certainly flew over here in a hurry, as it was delivered to us before eleven o'clock this morning.

After our telephone conversation of yesterday, we had a further discussion with Ted Myers, and told him that unless the owners were willing to make a reasonable deal, none of us would be interested in spending good money for work on the property. Ted Myers is going back in any event, so Anderson dug out a copy of a proposed contract which you prepared for us some time ago, in connection with a Western mercury proposition that was submitted. We told Ted Myers to show this to the owners of the property, to give them an idea of what his principals thought a contract should contain. According to Ted, these people have come down in their price, and told him that they would take \$75,000.00 cash, or \$100,000.00 over a year. He seemed to feel that a more rational deal, however, could be worked out. They furthermore told him that if he could arrange to start immediately, they would give a seventy-five day option, if it were agreed to do certain further work on the property, namely, to continue the present tunnel. But, it would seem to me it would be more desirable to drift on the present ore body, or else do both. Somehow or other these people feel that there are two well mineralized veins in this mountain, and that they have only cut the first of the two, and that the lower tunnel should be continued to cut the second vein.

Ted Myers wanted to get back to talk with Boardman as promptly as possible, so he left before your report arrived, but this makes no difference. He is to wire us and then we

CONTINUATION OF LETTER TO

Mr. G. M. Colvocoresses

are to get in touch with you, and if it appears desirable, we can arrange for the two of you to ~~go~~<sup>get</sup> together ~~to~~<sup>at</sup> Payson.

I have now looked over your notes and Lausen's report, and these more or less jibe with what Ted Myers told us. According to Ted, the upper tunnel has some mineralization, but is only good in what he says is a rather pronounced vein, apparently of rhyolite, some seventy feet back from the portal of the tunnel. Ted said this vein is 15 feet wide. On page 3 of Lausen's report, the samples taken from 70 to 95 feet, ran:

70 - 75	0.416 Hg
75 - 80	0.190
80 - 85	0.194
85 - 90	0.504
90 - 95	0.266

Ted took three 5-foot samples in this region, and our assays were,

First 5 feet,	0.64
Second 5 feet,	0.54
Third 5 feet,	0.11

Considering the variations in mercury ore, and considering the fact that these samples do not represent the same spots, I supposed this was a close enough check for the present argument.

I note in Lausen's report that they consider<sup>ed</sup> steam-shovelling the whole mountain side, so to speak, and naturally they were interested in an average throughout the tunnel, which they put down as 0.110 per cent Hg. Ted, on the other hand, felt that most of this rock was worthless, and that the whole thing hinges on the mineralization of what he called the veins. I note that you did not take any special samples in this tunnel.

CONTINUATION OF LETTER TO

Mr. G. M. Colvocoresses

Coming to the lower tunnel, I note that Lausen said the tunnel was driven in 65 feet, while you say it was driven in 70 feet. Ted now reports that it is driven in 92 feet. You took three 5-foot samples in the first 15 feet of the tunnel, and report a second sample as containing 0.53 per cent mercury. Ted said that there was a high grade stringer in the front part of the tunnel, but he did not sample this, because he thought the quantity was not sufficient to make it of any particular interest. On the other hand, the last 13 feet of the tunnel are heavily mineralized, and I must say that the samples of ore which he brought in here, some of which were quite big chunks, were the best looking mercury ore that I have seen for a long while. Throwing out the high grade pieces, and trying to get an average sample of what he brought in, we analyzed it at 0.54 mercury, and Ted seemed to feel that the average would run better than this, rather than under. Ted said that both walls, as well as roof and floor of the tunnel, were in the same kind of ore, and he blew off quite a lot with powder to make sure of his ground. He also blew out about 2 feet on the face of the tunnel, and the sample which he brought in from this shot, ran 0.32 per cent mercury.

According to Ted, the tunnel is not yet through the mineralized vein, and 13 feet are definitely exposed, and with his last 2-foot shot this would make it 15 feet. This is the ore which neither you nor Lausen saw.

The table on page 3 of Lausen's report, does not show any mineralized vein in the front part of the upper tunnel, but Ted said there is a zone which shows mineralized stringers in a definite vein, which, according to Ted's description, would be <sup>at 74'</sup> a 35 to 45-foot zone, which Lausen puts down as hard brittle rock; and for some reason Ted and Boardman feel that the mineralized zone, at the end of the lower tunnel, is an extension of this vein in the upper tunnel, and that the mineralized vein <sup>at 14'</sup> back of the upper tunnel has not yet been reached in the lower tunnel, and that for this reason the lower tunnel should be continued until the second vein is cut. I cannot comment on this, as I know nothing about it. It would seem to me that if any work is to be done, it would be best not only to continue the lower tunnel, but to drift on the heavy mineralized vein.

CONTINUATION OF LETTER TO

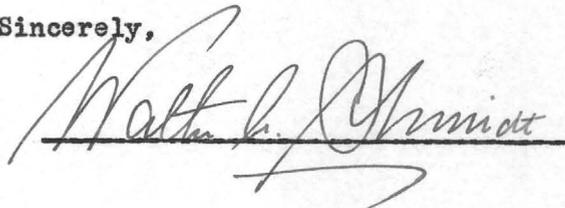
Mr. G. M. Colvocoresses

In the event that Ted wires that Boardman is reasonable, I will wire you and ask that you meet Ted at Payson, and look at the newly exposed ore body, and as you will want your papers with you, I am returning them herewith.

In addition to the grade of ore, you will, of course, want to give consideration to the mining question. Ted seemed to think that it would be an easy matter to mine out this vein, but it appears from Lausen's report that he thought this would be a rather difficult task, in view of the nature of the rest of the ground.

You are quite right that we do not want to be stampeded on this matter, but Anderson, Welch and I all thought that the large samples of rock which Ted brought in here, and which he claimed to be representative, were the nicest looking cinnabar ore that we have seen, and Ted is hard-headed enough so that he does not kid himself absolutely. Of course, his knowledge of geology is limited, and he has a fair degree of enthusiasm, and for this reason I would want your confirmation before drawing any conclusions. You will remember that we wrote to Duschak, when we first heard about this property. He indicated that the Bradford's *Brooklyn* would be much interested in a property that would have a large tonnage of one-half per cent mercury ore; so we will have one party who is interested in a bona fide manner. Although we would not be in a position to finance the venture ourselves, we might do enough preliminary work to prove the value of the property, if the present showing is such as to indicate that there is any value to the property.

Sincerely,



Walter L. Schmidt

WAS AEG  
Encl.

October 23, 1931

Mr. Walter Schmidt,  
Western Precipitation Co.,  
1016 West 9th Street,  
Los Angeles, California.

Subject: Mazatzal Mercury

Dear Walter:

You have doubtless received the reports and hurried letter which I sent you on Wednesday evening and I had no opportunity to write yesterday. I wish, however, to cover the situation a little more fully and hope that you will receive this before deciding upon any definite action one way or the other.

The mercury deposits in the Mazatzal's have been known for a number of years and are generally described in the Bulletin of the University of Arizona No. 122, issued on June 1st, 1927. I have only one copy of this, but will lend it to you if you care to have me do so. A number of attempts to develop these mines have been made in the past under competent technical direction and backed by large capital, but up to-date everyone of these has been a failure and represents a heavy loss to the investors and the same is true of every other mercury mine in Arizona.

A few years ago Bill Gohring, who is a personal friend of mine and a good Engineer, formerly mine Superintendent and Assistant Manager of the Calumet and Arizona, became interested

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in these properties and spent quite a little time on a personal investigation. He was particularly impressed with Pine Mountain where the values seemed to be disseminated through a large area of rock and he thought that the occurrence of ore might be comparable to the copper in the porphyries. Gohring claimed that if anyone would consider these deposits from that standpoint and undertake to operate them along the same lines as the porphyry coppers that they could expect to mine a very large tonnage at a very low figure per ton and to handle a low grade of ore with profit. The *critical* grade he placed at .2% or .2½% mercury.

Gohring and I discussed this matter frequently and I agreed with him in principle but felt that considering the remote location of Pine Mountain it would be extremely difficult to induce any Company or group of investors to make initial investments of several million dollars required for carrying on such operations as he proposed.

Gohring took Tally up to Pine Mountain with him and Tally was rather impressed by his short visit and arranged to send Carl Lausen, who was for a time geologist for the Arizona Bureau of Mines, but was then employed by the United Verde Company and ~~is~~ <sup>is</sup> considered an excellent man on mercury. You have <sup>seen</sup> a copy of Lausen's report and on the strength of his recommendation the United Verde turned down the property and have done nothing further with it.

Gohring was not satisfied with this situation and both of us felt that since the General Electric Company were developing the mercury vapor boiler they would be the logical

concern to approach concerning an operation of this magnitude. Accordingly, thru Elihu Thomson, who is one of our principal backers at Meteor Crater, I got in touch with the Officers of the General Electric and presented the matter to them as Gohring had outlined it to me. The result of this correspondence was a very definite statement by the General Electric that altho they had confidence in the future of their boiler and believed that it would eventually provide a very large demand for mercury they themselves would not consider undertaking any mining operations whatever, but would trust to their ability to purchase mercury when and as such a demand developed.

In the early part of 1929 a bunco outfit known as the Chase Mining Company optioned the Pine Mountain property and some Professor who was sent out from Quebec reported that this was the greatest mercury mine in the world. They did a little development work before they were closed up by the Post Office authorities and their creditors and it was reported to us that a very high grade of ore had been developed in the lower tunnel which had not been run when Lausen made his examination.

About a year ago Edgar Baruch told me that his relatives, the Haas family of San Francisco, were eagerly seeking a mercury property and would follow up any recommendation in that line that I might be able to make and in view of the reports mentioned, upon Gohring's insistence that the property still had value I arranged with him to examine this mine and we made a trip jointly at our own expense in the early part

of November 1930.

We didn't attempt to sample the less recent workings since this had been very thoroughly done by Lausen, Gohring, <sup>Bed-</sup>andford and others and in the lower tunnel we found a width of only 15 ft. which showed any trace of cinnabar and according to our samples only 5 ft. of this contained better than .5% mercury.

Giving due weight to all of the factors involved in this project and to the terms which at that time I considered most unreasonable I didn't feel that I could recommend the property to Baruch or anyone else and Gohring also seemed to be disappointed with what we had seen and tells me that he has not followed the matter any further nor kept in touch with any recent developments. I have, however, written to Boardman to find out just what has been done during the last few months.

Now, it is my general opinion that a large body of low grade ore exists on Pine Mountain, but if it were to be worked by steam shovel I do not believe that the average grade would exceed .1% mercury which is non-commercial. I also believe that there are stringers of ore which will run 2.5% and that these might be made the basis of a comparatively small operation which, however, would not be likely to return any profits because of the purchase price plus the cost of providing transportation facilities, mining and smelting equipment.

Practically all of the other properties in the vicinity of Pine Mountain, particularly the Sun Flower have shown shoots of high grade ore some of which ran better than 2% mercury and in some cases even better than 5%, but ~~every~~ one of these

October 23, 1931

occurrences of high grade ore proved to be comparatively small and as I mentioned above, the mining operations have always been unprofitable.

Perhaps the Pine Mountain would prove an exception and a large body of good ore might be developed, but after having examined a number of the other properties and gone over their reports to some extent I could feel no justifications for such an opinion.

Now I am very sure that in its present state of development, Pine Mountain is not likely to appeal to concerns like the Bradleys or any other large Company and whoever takes it over now will have to spend quite a bit of money in future exploration or development unless, of course, this last work which I have not seen has opened up a phenomenally good showing.

Such additional development would involve drilling and tunneling and in my personal opinion, considering the remote location would cost not less than fifteen or twenty thousand dollars even tho it should give uniformly favorable results. Moreover, you would probably have to make a first payment of purchase price or at least pay something per month to the owners unless they have radically changed their ideas during the past year.

I would not wish to see you personally undertake a project of this kind, believing as I do that the outcome would be very doubtful and if you decide to go ahead at all I hope that you will be able to arrange to associate yourself with a number of others who would bear part of the expense for, as you know,

Mr. Walter Schmidt,

-6.

October 23, 1931

a project of this kind keeps demanding more and more money all of the time unless and until it can be profitably turned over to other parties.

I believe I have covered the situation as fully as possible for the moment and if you feel that my opinion is too pessimistic or would be substantially revised if I should see the recent development I will be very glad to revisit the property either alone or with Myers and without compensation other than repayment of expenses.

Just at the moment I am trying my "darndest" to get Crater affairs straightened out, but the trip to Pine Mountain would not require more than three or four days and I could pretty surely spare time for that without much difficulty and on comparatively short notice.

Best regards,

Sincerely,

GMC:HG

P.S. Since dictating the above yours of the 22nd returning my papers has arrived. I note that the owners have come down on terms and Boardman is a reasonable man, but his partner, Reynolds, is quite unreasonable. However, if Boardman controls the situation a fair deal may be worked out.

You misunderstood the location of my samples, which, as stated in my notes, were taken at the breast of the tunnel which was then in 70 ft. and not as assumed near the portal. Aside from a few small stringers this lower tunnel was blank for the first 55 ft. from the portal. The next 5 ft. assayed .095 mercury. The section from 60 to 65 ft. assayed .53 mercury and the last 5 ft.

from 65 to 70 ft. assayed .17% mercury and appeared to be going out of the ore. I note that an additional 22 ft. has now been added to the length of this tunnel and that the last 13 ft. are heavily mineralized and that the breast appears to be still in ore.

There appear to be two veins exposed on the surface and in the upper tunnel which was sampled by Lausen, the first vein was cut by the lower tunnel 55 to 70 ft. from the portal and probably the second vein has now been cut 80 to 92 ft. from the portal. However, the veins are not well defined and there may be other areas of mineralization further in the hill.

I am often told that the Bradleys and others are looking for mercury mines, but fear that they would insist upon a substantial tonnage being actually developed and this could only be accomplished as you suggest, both by cross cutting thru extending the present tunnels and drifting on the veins and, if the length of the ore shoots proved small, no large tonnage could be calculated even after this work was accomplished and drilling such as Gohring recommended would become necessary.

My letter above explains Gohring's suggestion regarding mining with steam shovel and if operations were conducted on a comparatively small scale the ore would have to prove very high grade indeed to repay from profits the initial expense and the mining costs which are sure to be high considering the remote location and other adverse physical conditions.

The specimens of ore from this property as you say look remarkably good and have attracted favorable attention from all the Engineers who have seen them, but subsequent examinations have never resulted in a deal.

Should you wire me to do so, I will arrange to meet Myers at Payson and we can go over the matter fully on the ground and make another examination.

November 2, 1931

Mr. Walter A. Schmidt,  
Western Precipitation Company,  
1016 West Ninth Street,  
Los Angeles, California.

Dear Walter:

Subject: Mazatzal Mercury  
Pine Mountain

Just back from the trip to Pine Mountain, which I thoroughly enjoyed, including a strenuous ten mile hike. The weather was lovely and I annexed a few quail, returning yesterday.

On Friday afternoon I met Ted Myers at the Camp of the Arizona Mercury Mines and since it was too late to continue to Pine Mountain that day and there was serious doubt as to the existence of bedding and grub at the Pine Mountain Camp we took occasion to go through the workings of the Arizona Mercury property and spent the night at their camp.

Saturday morning we drove five miles further, as far as one could go with a car, and then walked up to Pine Mountain where we thoroughly inspected both the lower and upper tunnels and returned in the afternoon. I shall send you, by express, five samples. I did not take more nor make these any heavier than necessary since they had to be taken to the car by man-power.

The showing in the lower tunnel is very encouraging and considerably better than when I visited it a year ago, at which time the breast was 70' from the portal. Since then there has been an advance

of 22 ft. the first 10 ft. of which appear to be practically barren but the last 12 ft. show good ore and the face of the drift is evidently quite rich material. This is represented by my sample PM No. 1, and P.M. No. 2 was taken along the 5 ft. from the breast to a point 85 ft. from the portal, No. 3 from 85 to 88 ft., No. 4 from 80 to 75 ft., No. 5 from 75 to 70 ft. I sampled on the opposite side of the tunnel from where Myers had taken his sample, but have no doubt that the results will check fairly well and when I make up the report I will include a drawing of the lower tunnel and also of the upper tunnel, showing the values represented by these recent samples and those which I took last year and Lauser's samples in a portion of the upper tunnel. The upper tunnel had been advanced since Lauser visited the property from a distance of 120 ft. to a total of 224 ft. but the last 104 ft. was in hard blocky ground and certainly quite barren of any values whatever. I will also explain in my report about the two parallel ore shoots which it is difficult to make clear without the aid of a map, but it is my opinion that the lower tunnel is now in the first ore shoot which is the only one developed by the upper tunnel and that the second ore shoot, which is shown in a cut on the other side of the hill quite a distance to the southeast, will not be cross cut until the lower tunnel has advanced some 300 ft. and there is no definite indication that <sup>the ore</sup> ~~it~~ will continue downward.

The present showing in the lower tunnel certainly justifies the owners in continuing the cross cut and determining the width of this very nice looking ore shoot and it is possible that they may be running into some really high grade ore, but the extent of the

ore is entirely problematical.

I found that Myers had met no progress with Boardman in reference to terms and had only a very hazy idea of what the owners wanted. He had not showed Boardman the pro-forma agreement which you gave him in Los Angeles and had nothing in writing, but merely Boardman's verbal statement to the effect that they wanted \$75,000 cash or \$100,000 if payment was spread out over one year.

Since the question of terms seemed very essential I drove on to Payson (forty miles further), on Saturday evening and together with Myers interviewed Boardman and insisted that he put in writing the best terms which he was willing to extend and his pencil memo is herewith enclosed, which leads me to repeat my previously made statement to the effect that the owners are most unreasonable and their terms entirely prohibitive.

You will note that it will not be possible to carry out any such plan of procedure as Myers had in mind. Boardman insists that at least five men should be employed by any party taking an option on the property so that at least one hundred and fifty man shifts per month should go toward development and even if Myers worked for nothing except his board the development would cost you close to \$1,000 a month including <sup>Myers</sup> board for the men, explosives, etc. There is no equipment on the property, not even a proper set of hand steel and everything would have to be trucked in to the end of the road and then packed up on burros, five miles to the Camp.

Working on this basis for seventy-five days at an expense

of about \$2,500, it might be possible to advance a total of 300 ft. or <sup>less</sup> ~~more~~, probably about 250 ft. and this would permit cross cutting the present ore showing assuming that it is a width of 20 or 30 ft. and then drifting laterally for possibly 200 ft. with short cross cuts to determine its width at various points. If it should be determined that the ore has an average width of 20 ft. and a length of 200 ft. the area would represent roughly 300 tons per vertical foot, but we know that there is no commercial ore in the upper tunnel and in order to determine the vertical extent of the ore body it would be necessary to put up a raise from the lower tunnel and also to sink a shaft or winze which as you well realize would mean the purchase of equipment, heavy expenditure and would require a substantial amount of time. At the end of 75 days you would face a payment of \$35,000 on purchase price and another \$20,000 fifteen days thereafter so that at best you would be out-of-pocket some \$28,000 in three months time and could not have possibly have done any more than determine the area of the ore shoot in lateral extent, but would have practically no information concerning the vertical dimension.

As to the grade of the ore, - while the breast of the tunnel looks as if it might run 1% or better I greatly doubt if the average over 20 ft. width and in appreciable length would exceed .5% and the net profit in .5% ore can hardly be figured to exceed \$2.00 per ton at present prices of mercury.

I think you will feel that this entire proposition is by no means attractive and in making my report I will give you additional

November 2, 1931

reasons for reaching that conclusion and I strongly advise that you should not go to any further expense on this matter whatever.

Boardman and his associates are all pepped up as usual because some other people have been talking to them about purchasing their property, notably some outfit from Texas whose Engineer is expected daily on the ground and the property was also recently visited by De Camp and <sup>e</sup>Bendict from the United Verde Company who are reported to have been much pleased with the showing, but from what I know of the policy of the United Verde they are very unlikely to talk business and I am very sure that they would not listen to any such terms as Boardman proposes.

Of course, the owners might consider some alternative proposition, but from my point of view the chances are ten to one that any money which might be spent in developing this mine is unlikely to bear fruit except on the chance that some very high grade ore might be found or that it would make the showing sufficiently attractive to appeal to other parties who would take over the property at some profit to the party who might hold the option.

As soon as the samples are analyzed I suggest that you advise me your wishes so that I can communicate directly with Boardman or if you prefer, write him direct at Payson, Arizona. Perhaps you will have no difficulty in reaching a conclusion as soon as this letter, including the terms, reaches you or you may prefer to wait the arrival of the report which I will send as soon as the assays of the samples are available, but my own opinion regarding Pine Mountain, as now offered by the owners, has not changed to any extent whatever and I only repeat my recommendation that you should

Mr. Walter A. Schmidt,

-6.

November 2, 1931

do nothing further at the present time.

Thank you very much for the check for \$75.00 received this morning, and I will get my accounts all straightened up in the course of a short time.

Best personal regards,

Sincerely,

S. mc

GMC:HG

ENCL.

GEORGE M. COLVOCORESSES  
MINING AND METALLURGICAL ENGINEER  
~~HUMBOLDT~~ ARIZONA  
Phoenix

### REPORT ON PINE MOUNTAIN MERCURY CLAIMS

This property I visited in November of 1930 with Mr. W. M. Gohring, and again on October 31, 1931 with Ted Myers. Charles McFarlane, associated with the owners, accompanied us on both trips. I have also visited certain other properties in the district, particularly the Sunflower Mine and the Mercury Mine of Arizona and since these have been developed and operated to a considerable extent suggestive information was obtained from their inspection. I have studied reports on Pine Mountain made by Gohring and Carl Lausen, of the United Verde Copper Company and the report on the district issued by the Arizona Bureau of Mines, Bulletin No. 122 and have seen the results of samples taken by Bedford, Beckwith and other Engineers. I have availed myself of all of this data in preparing this report.

#### PROPERTY AND LOCATION

The Pine Mountain property consists of eighteen unpatented claims located on the southwest slope of Pine Mountain in the Mazatzal range Northeast corner of Maricopa County, Arizona. The owners are W. D. Boardman (two-thirds interest) and Wm. Reynolds (one-third interest) both of Payson, Arizona.

The nearest railroad point is Globe, eighty three miles distant and from Globe the property is reached by following the State Auto Road (Globe to Payson) for sixty six miles, then a rough County road along Slate Creek for twelve miles and a burro trail up Sycamore Creek for five miles. The present cost of transporting supplies from Globe to Pine Mountain may be figured at about \$30.00 per ton.

The elevation of Pine Mountain Camp and mine workings is about 5,300 ft. and the Country is very rough with steep contours. There is no timber of value except some small cypress, but a very dense growth of brush covers all the surface and makes travelling and prospecting extremely difficult. The Camp consists of two tents near a small spring of good water. There is no mining equipment and all previous work has been done by

hand steel, since removed.

### GEOLOGY AND ORE OCCURENCE

The formation of these claims and of the district in general is largely pre-Cambrian, sericite-schist of brownish color with bands of redish slate. The strike of these sedimentary rocks is northeast-southwest. The dip is to the northwest at an angle of about 50 to 60° except in the folds and crushed zones which are numerous. These rocks have been intruded by irregular masses of rhyolite porphyry, also schistose in structure, and locally by a rock which appears to be a species of tufa.

The cinnabar, together with quartz and calcite have been deposited by mineralizing solutions both in schist and porphyry. Generally the cinnabar occurs as minute particles disseminated thru limited areas of rock which will carry from .01 to as much as .1% Hg. The richest portion of these deposits is usually found in the porphyry where the cinnabar occurs as a thin film (locally termed paint) in the bedding places of the rock or in tiny seams and veinlets forming pockets of ore which will average .25% Hg or better. The extent of these pockets at Pine Mountain has not been determined but at the Sunflower and Mercury Mine many of them have been worked out and as far as I could see or learn none had an extent of more than 100 ft. in length, 30 ft. in width and 200 ft. in depth. The average size was much smaller and the occurrences of these pockets is erratic and comparatively infrequent.

### DEVELOPMENT WORK AND ORE BODIES

Three areas of low grade mineralization are apparent on the surface at Pine Mountain and very likely there are others not yet discovered.

AREA ONE is located in a tongue of porphyry near the Camp site and Lausen gives it a length of 350 ft. along the strike (northeast-southwest) and a width of 30 ft. This is developed by surface pits and the tunnel where Lausen took four samples which averaged less than .03% Hg. A little further north another showing 15 ft. wide is developed by a surface out which shows .016% Hg. I did not sample this showing as Lausen's work may be considered absolutely reliable and only occasional specks of cinnabar are to be seen in the rock.

AREA TWO is located in porphyry on the north side of the

Creek directly West of Number 1, about 1600 ft. Mineralized rock is shown here in several pits and in a surface trench made by Lausen where samples over a width of 52 ft. showed an average grade of .025% Hg. Lausen gives this showing a length of 225 ft. and an average width of 35 ft.

Other samples taken by the owners and by Beckwith, Bedford and Gohring confirm Lausen's results or in some cases show a higher grade, but do not indicate the presence of any commercial ore.

AREA THREE is the most important and the only partially developed portion on the property. It occurs in a mixed-up formation of schist, porphyry and tufa about 600 ft. south of No. 2 and on the south side of a steeply sloping ridge rising from the Creek. Just south of the summit of this ridge there is a cut in which a little low grade material was noted and samples were obtained by Lausen and others showing from .02% Hg to .05% Hg. This represents the out-crop of what may be termed the south vein which has not yet been reached in any of the underground development work.

About 500 ft. to the North of this is noted the out-crop of the north vein which has been cross-cut by two adits. The upper adit is driven about 250 ft. below the crest of the ridge, the lower adit some 80 ft. below. The length of this mineralized area, according to Lausen is not over 200 ft. but he may have under estimated. It's width in the upper tunnel is placed at 125 ft. and is as yet undetermined in the lower tunnel. Lausen carefully sampled the upper tunnel in 5 ft. sections through-out it's entire length, namely, 120 ft. and he obtained an average of .110% Hg. For a width of 25 ft. (from 70 to 95 ft. from the portal) the tunnel averaged .314% Hg and one 5 ft. section showed .504% Hg. Myers recently sampled the best 15 ft. of this tunnel and obtained .73% Hg which is considerably higher than Lausen. After Lausen left the property in September 1927, the tunnel was advanced to a total length of 224 ft. from the portal, the object of this being to eventually reach the downward extension of this south vein, but this vein, (allowing for the dip) appears to lie over 100 ft. beyond the present face of the tunnel. From 120 to 224 ft. the rock is hard blocky porphyry and tufa and appears to be entirely barren of values.

The lower adit now 90' long was run in for 70 ft. in 1928 and 1929 by the Mercury Mines of Arizona and by the Chase Mining Company who held successive options on Pine Mountain and the last advance of 20 ft. was made in September of 1931 by the owners of the property.

The first 55 ft. of this tunnel is largely in schist and tufa and does not appear to contain anything more than traces of mercury, but from 55 ft. onward the tufa cuts into porphyry and a higher mineralization is noted. In 1930 Gohring and I took three samples in 5 ft. sections beginning at 55 ft. and on the occasion of my last visit Myers and I took four samples in 5 foot sections covering the last 20 ft. of the tunnel and a fifth sample representing the present face which appeared to show a much better grade of ore. Results of these samples are as follows:

Section of tunnel from portal -

55' to 60'	=	.095% Hg	2
60' to 65'	=	.53 % Hg	10
65' to 70'	=	.17 % Hg	3.4
70' to 75'	=	.04 % Hg	
75' to 80'	=	.02 % Hg	
80' to 85'	=	.05 % Hg	
85' to 90'	=	.13 % Hg	2.6
and face	=	.62 % Hg	12.4/10

The material found from 55' onward appears to represent the downward extension of the south vein which is found in the upper tunnel at from 60 to 90'. It can, therefore, be stated that both the width and grade of this ore shows some improvement in the depth intervening between the adits and justifies the hope that a larger and better body of ore may be found below the second adit. Unfortunately this second adit is run on the level of the Creek so that no further exploration would be possible in depth except by resorting to a winze or shaft which, under local conditions, would be a very expensive procedure.

ECONOMICS OF THE PROPOSITION

Gohring, who has been familiar with this property for the past four years, believed that there was a possibility of developing at Pine Mountain a very large area of disseminated ore which might average .2 or .25% Hg and which by the application of methods similar to those employed in mining the Porphyry Coppers could be worked with a substantial profit. While it is impossible to definitely criticize this opinion without first

conducting an expensive exploration by drilling and other methods, the results of all examinations seem to indicate that each of the mineralized zones is comparatively limited and surrounded by large areas of barren rock and that the average grade of even the mineralized portions near the surface does not exceed .1% Hg. There are as yet no indications of the existence of any large body of higher grade ore at greater depth. Moreover, I do not believe that it would be possible to work .25% Hg ore with any profit or to obtain working costs comparable to those of the Porphyry Coppers unless and until<sup>a</sup> a railroad had been built for 80 miles from Globe to a point on Sycamore Creek just below Pine Mountain. In addition to this enormous expenditure, a great amount of development and equipment would have to be provided so that the total preliminary cost involved in any such operations as Gohring contemplated would run into many millions of dollars and seems absolutely prohibitive from all present evidence and indications.

The theory of some other Engineers and of the owners of the property has been that the higher grade ore shoots could be mined on a comparatively small scale (as at the Sunflower and Mercury Mines) and that a profit could thus be made in working ore which would average better than .5% Hg. They believe that the comparatively low values shown on the surface and in the upper tunnels will increase with depth and that a substantial tonnage of 1% or better ore will be developed at greater depth. I agree that the grade of the surface ore is likely to improve with depth, but I have seen no evidence that any substantial tonnage of high grade material is likely to be developed at Pine Mountain or anywhere else in this district. The very similar surface showings at the Sunflower and Mercury Mine all proved to overlie ore shoots or pockets of very limited extent and while portions of these shoots produced 3% and even a better grade of ore, the average output of these mines has been in the neighborhood of .3% and the search for and development of these small pockets and shoots has been so expensive as to render the operations unprofitable. Altho a considerable production is credited to both of these mines and a smaller tonnage to several other neighboring properties, yet (with the possible exception of the small Chris. Martin Mine) there is not a case on record where the net returns have repaid the development, mining and treatment costs and the initial investments aggregating several hundred thousand dollars have been a

dead loss as far as I can gather. There is nothing in the present showing at Pine Mountain which leads me to believe that the future record of this property would be substantially different from the past record of these neighboring mines, altho this opinion might be revised by subsequent development. In any event, it is certain that the preliminary expense at Pine Mountain will be very high and I tabulate below, certain items of cost which would have to be met before the mine could ever be put on a producing basis, assuming that the furnacing of the ore would be carried on at a suitable location on Sycamore Creek, some four miles away from the mine and to which point the ore could be transported by a gravity rope-way.

Truck road to property, 5 miles at \$7,000 per mile - - - - -	\$ 35,000
Camp buildings, pipe line, etc., - - - - -	5,000
Mining and shaft equipment including power plant for development only - - - - -	25,000
Sinking shaft to depth of 500' including pumping & timbering	50,000
Drifts, cross cuts, raises, etc., on 5 levels- - - - -	75,000
Additional mine plant and power plant for regular operations	30,000
Rope-way to furnace site- - - - -	35,000
Furnace and accessories- - - - -	60,000
Miscellaneous- - - - -	10,000
T O T A L	\$325,000

Add purchase price- - - - -	75,000
TOTAL INVESTMENT - - - - -	\$400,000

An expenditure of this order might permit the property to operate on a basis of 50 to 60 tons per day and the working cost might be estimated as follows:

	<u>Per ton</u>
Mining, including development in ore- - - - -	\$ 5.50
(Lausen estimated \$6.00 and cost of mining and transportation at Mercury Mines is given me as \$6.50)	
Crushing and transportation to furnace- - - - -	1.00
Furnacing- - - - -	1.00
Selling and general expense- - - - -	.50
T O T A L	\$8.00

With mercury selling as at present at about \$1.00 per pound and a recovery of 95% the profits per ton of ore would be as follows:

Grade	.5% Hg
Value per ton	\$9.50
Profit	\$1.50
Grade	.1% Hg
Value per ton	\$19.00
Profit	\$11.00

Assuming as a possibility that the development outlined above should prove two shoots of ore respectively in the north and south veins, each having a length of 200' an average width of 20' and a depth of 500' we

should have a total ore reserve of approximately 320,000 tons. The net profit, which might be expected from mining and treating this ore after deducting the initial investment of \$400,000 would be \$80,000 in the case of an average grade of .5% Hg and \$3,120,000 if the ore should average as high as 1%.

It appears to me that the risk involved in developing this property would only be justified in case there appeared to be good reason for believing that an average grade of 1% ore could be mined from this property and as noted above, this is from 3 to 4 times as rich as the average ore produced by any of the other mines in this district. Moreover, no one of these other mines has produced any such tonnage nor, so far as I can learn, has this been turned out by the entire district to date and none of the ore shoots have so far proved continuous to a depth of 500 ft. so that the chances of developing any such ore bodies at Pine Mountain appear exceedingly slim.

#### CONCLUSION

I consider that the present showing in the lower tunnel at Pine Mountain is encouraging and should lead the owners to continue their exploration at least to a point where they have delimited the extent of the fairly high grade material now showing in the surface of the adit. Should this work prove up a substantial area of 1% or better ore, other parties might then be justified in taking a lease and continuing the development provided, but only provided, that no cash payments were required by the owners for a period of at least a year. Even on this basis I do not consider that the new comers would be engaging in an attractive mining venture except on the theory that they might be able to dispose of their interest to other parties at some profit.

In view of the terms of payment which are asked by the owners or any modifications which they would be likely to accept I must unqualifiedly condemn the entire proposition and recommend no further action or expense in connection therewith.

Yours very truly,

*S. H. Colverson*

GMC:HG

Phoenix, Arizona.  
November 17, 1931

Home Mass.



WILLIAM CARNIE, JR.,\* reports

# War Demands Boost Quicksilver Output



J. D. HILL  
TONTO BASIN - ARIZ.

February 28, 1941

Mr. Richard Simis  
Phoenix  
Arizona

Dear Mr. Simis:

Your letter of the 11th regarding possible interest in purchase of the Ord mining property was received some days ago and I thought at the time that I would get in to see you. However the continual rains caused havoc with the roads out this way so that I have not been able to make the trip.

I ask your indulgence for the delay in replying and assure you that it in no way indicates a lack of interest in your proposal.

I feel sure that we could make a price that both you and your engineer would consider reasonable.

Your first stipulation regarding examination, access to production records etc. is perfectly acceptable.

With regard to the second stipulation: the property is now informally or verbally tied up for a few days to other parties, subject to their ability to raise funds and I am under the personal opinion that they will not make the turn. Beyond that, as the property is operating on a profitable basis and development is proceeding with favorable results, I doubt if an option for forty five days, gratis, would be considered, and suggest the following:

Your engineer to come out when the present tie up referred to is off. We will give him all the assistance possible. Then if and when his observations should justify a favorable report, an option to be given you for two or three weeks. The owner is not here at present but from my last conversation with him I believe the price of \$30,000.00 which was acceptable to him at that time would still prevail, providing the matter did not string along too long.

I will be glad to hear further from you at your earliest convenience.

Sincerely,



March 4th, 1941

MEMO RE: MR. HILL'S LETTER OF FEBRUARY 28th RE MOUNT ORD MERCURY MINE

Copy to:

Mr. Richard Simis, Luhrs Building, Phoenix, Arizona

It seems to me of paramount importance to first obtain from the owner a definite and binding assurance that he would agree to option the property for \$30,000.00 and would permit this option to run for a period of at least three weeks or preferably 30 days in order to give time for a thorough examination of the property. First payment on account of the purchase price should not exceed \$5,000.00 and similar payments of \$5,000.00 should not be expected at intervals of less than 60 or preferably 90 days thereafter.

If you write to Mr. Hill this afternoon requesting that he obtain such assurance from the owner, subject of course to the present deal with other parties failing to be consummated, it seems to me that the required assurance from the owner could probably be obtained by the latter part of this week and by that time the present verbal option will probably have been exercised <sup>or</sup> ~~and~~ expired.

I can probably arrange to make the examination, if desired, most any time upon being given two or three days notice. It would not appear to me that a preliminary examination and conference with Mr. Hill could be expected to accomplish any very useful purpose.

Yours very truly,

*L. H. Colvocozen*

March 4th, 1941.

Mr. J.D. Hill,  
Tonto Basin, Ariz.

Dear Mr. Hill:-

I acknowledge receipt this morning of your letter dated Feb. 28th, and in reply would state that under certain conditions, I would be very much interested in a deal involving the purchase of the Ord Mt. Mercury mine.

1. I would have to have from the owner a definite and written assurance that he would agree to option the property for a total purchase price of \$30,000.00/
2. This option would have to run for at least 30 days in order to give time for a thorough examination of the property and, if such examination produced a favorable report, time to arrange for the first cash payment.
3. First payment on the purchase price should not be in excess of \$5000.00, with similar payments at intervals of 60 or 90 days thereafter.

It appears to me that the above conditions should be considered as reasonable by the owner, if he really wants to sell; we, on our part, have no desire to "stall" or "haggle", over terms, and wish that you would convey to the owner when you present these terms that any modification of the above requirements would not be accepted.

With kindest personal regards, I remain,

Very Truly,

DATE

SUBJECT

COMPANY

INSURANCE SERVICE AGENCY, INC.  
Luhrs Building  
PHOENIX, ARIZONA

Int Card Mercury

March 4th, 1941

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Yours very truly,

Zou

C O P Y

J. D. HILL  
TONTTO BASIN - ARIZ.

February 28, 1941

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Phoenix, Arizona

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I will be glad to hear further from you at your earliest convenience.

Sincerely,

(Signed)

Mr Card, / Hill 3/22.41

Title & Roney 2 1/2 and 2 Foster

/ Hill >

1  
2

12500 cash in 30 days → explain.

Completed

with 5 plates from day

C O P Y

J. D. Hill  
Tonto Basin, Arizona

*Probably written  
also by. 5th or  
6th*

Mr. Richard Simis  
Phoenix, Arizona

Dear Mr. Simis:

I have your letter of the 1st and will write what I had in mind to say when I was in.

Mr. Ranney returned here as we expected, soon after the date of your visit, but as I did not anticipate, he brought a man with him who was interested in looking at the property with view to purchase; hence I was stalled for the time in proceeding with what I had in mind.

Now, any deal, from my standpoint, should include a fair price and terms to the seller; permitting reasonable expectancy of profitable operation to the purchaser and tending to continued confidence as between those concerned. It is such a deal that I am trying to get lined up and the deal as presented to the present parties, as I understand it, includes some features which I would not recommend to you and, as long as he sees a possibility of making a deal which includes those features, I do not see a possibility of his considering my outline.

However, I will put it this way; if within ten days opportunity does not occur for me to place my outline before Mr. Ranney, I will, if you wish, arrange for Mr. Ranney to come in and talk with you and you can soon tell if there is a possibility of getting together on any deal which would be acceptable to both of you, and so it will be on or off within that time.

Trusting that this will meet with your approval,

Sincerely,

(J. D. Hill)

Production continues steadily at the **Ord** mercury mine on Slate Creek near Tonto Basin, Arizona. A new 125-horsepower Waukesha unit has been installed in the plant, while the older and smaller engine will be kept for stand-by purposes. Ore is being mined from both the Ord and Rattlesnake groups. Sinking operations at the latter property, completed a short time ago, disclosed additional reserves of cinnabar ore of a satisfactory grade. Mining is conducted on two shifts with the furnace in continuous operation. L. E. Foster, Box 776, Phoenix, Arizona, is general manager, and J. D. Hill, Tonto Basin, is superintendent. W. V. Ranney, Route 1, Box 32, Highland, California, is owner of the property.

The new Gould rotary furnace is said to be operating satisfactorily on a 24-hour basis at the **Pine Mountain** cinnabar mine in the Sunflower district of the Mazatzal Mountains south of Payson, Arizona. Mining is carried on in three shifts, and a steady production of quicksilver is maintained. A winze is being sunk on the vein from the lower tunnel level, and present stoping is confined between this level and the surface. Samuel Joseph, Box 906, Mesa, Arizona, is general manager, and Perry Taylor is general foreman. The mine is owned by Henry A. and Harold J. Stromsem of Chicago, Illinois.

Arthur E. Wallace, 10 South Irving Boulevard, Los Angeles, California, is said to have given up his option on the property of the **Arizona Quicksilver Corporation** in the Sunflower district northeast of Mesa, Arizona, and operations have stopped. The mine is owned by T. J. Long and Gus Magnuson of Globe, Arizona.

situated on top of a ridge. The operating company was incorporated recently in California with a capitalization of \$100,000. P. D. Burt, Mills Building, San Francisco, is president and general manager.

**El Oro Mining Company**, organized as a corporation in 1935, has been dissolved and succeeded by El Oro Mining Company, Room 817, 68 Post Street, San Francisco, California, a partnership. General partners in the firm are Lester Moses, D. M. Donnelly, and Henry Mueller. The company controls a drift mining property in the New York mining district of Nevada County, California, and operations are expected to be under way by October 15. Development has been by tunnel in an old channel believed to be of Neocene origin. The ground was first worked in the late 60's.

Operations have been resumed at the property of the **Carson Hill Gold Mining Corporation**, Melones, California, following a forced shutdown while making hoist repairs. Fifty miners were out of work temporarily during the interval. John A. Burgess, Melones, is general manager.

The **Midland Company**, dredge operators, will work property of the **Elra Exploration and Mining Company** on the North Fork of the Salmon River in Siskiyou County, California. Operations were scheduled to start about October 20 on a three-shift basis, handling from 2,000 to 3,000 cubic yards every 24 hours. Leases covering several properties were held originally by the Elra Company, R. R. Stevens, manager, 105 Montgomery Street, San Francisco, California, and have been transferred to the Midland Company, which now has complete mining rights on several miles of the area. It is estimated that sufficient material for three to five years' work is available.

*For Mr Simis.*

May 12th, 1941

MEMO:

Have looked over Hill's letter to you to which I am attaching this memo as I have made a copy of the letter for my file.

It looks as if there was nothing you could do to hasten this transaction but since I assume that Hill's letter, not dated, was written around the 5th or 6th of this month it seems likely that he will be coming this way around the 15th or otherwise will advise you if other parties have taken over the Ord Mt. mercury property.

I am leaving tomorrow morning for a mine examination near Safford but expect to be back in the office by Friday and certainly by Saturday. Will be glad to help you then if it seems that anything can be accomplished.

*See Inclusion Summary Aug p. 99  
L.H.C.*

*5/21  
Simis showed that property had been sold  
for \$40,000 to Calif people but if payment of \$15,000  
cash has not presently made he would advise me  
later. Probably this should be forgotten*

J. D. HILL  
TONTON BASIN ARIZONA

Mr. Richard Simis,  
Phoenix, Arizona.

Dear Mr. Simis:

I have your letter of the 1st. and will write what I had in mind to say when I was in.

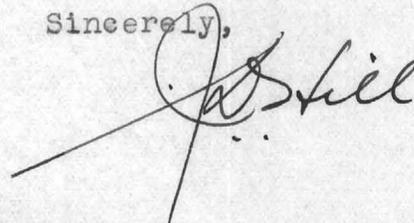
Mr. Ranney returned here as we expected, soon after the date of your visit, but as I did not anticipate, he brought a man with him who was interested in looking at the property with view to purchase; hence I was stalled for the time in proceeding with what I had in mind.

Now, any deal, from my standpoint, should include a fair price and terms to the seller; permitting reasonable expectancy of profitable <sup>operation</sup> to the purchaser and tending to continued confidence as between those concerned. It is such a deal that I am trying to get lined up and the deal as presented to the present parties, as I understand it, includes some features which I would not recommend to you and, as long as he sees a possibility of making a deal which includes those features, I do not see a possibility of his considering my outline.

However, I will put it this way: if within ten days opportunity does not occur for me to place my outline before Mr. Ranney, I will, if you wish, arrange for Mr. Ranney to come in and talk with you and you can soon tell if there is a possibility of getting together on any deal which would be acceptable to both of you: and so it will be on or off within that time.

Trusting that this will meet with your approval,

Sincerely,

A handwritten signature in dark ink, appearing to read "J. D. Hill". The signature is written in a cursive style with a large, sweeping initial "J".

## ARIZONA MERCURY MINE.

Note by G. M. Colvocoresses,

November, 1930.

Six miles along the Bush Highway from the turnoff from the Payson-Roosevelt road and located on Slate Creek is the Arizona Mercury Mine, operated by the Mercury Mines of Arizona, of which L. E. Foster of Phoenix is President or vice President, and Louis P. May was Assayer and is now in charge. In this mine the cinnabar is found principally in the schist, although associated in some cases with quartz. It is said that this property was the largest producer of mercury in the United States during 1929. (?) The mine is well equipped with camp buildings, power plant, etc., and has a Roster Furnace which May considers superior to the Gould, since only five gallons of oil were used per ton and recovery is said to have been in excess of 99%. Ore was crushed to 5/8" and the Roster furnace has only flue chambers for catching the dust and no Cottrell equipment. The oil here cost 11¢ per gallon. This property was first developed by the Spitzers some five or six years ago with Henry Gould as consulting engineer and Bedford as Superintendent, but later Gould advised dropping this mine after some \$70,000 had been expended, but no furnace yet installed, and his people accordingly abandoned this property, which was later taken up by Roster, backed by Woolworth Company officials, and the Spitzers transferred their activities to the Sunflower mine.

The elevation at the camp of the Mercury Mines of America is 3200'. Beyond the camp, and at a distance of 11 miles from the Slate Creek Turnoff, the road on the way to the Sunflower crosses a divide at an elevation of 4180'.

At the Arizona Mercury Mine, one body of good grade ore was discovered and mined, averaging about .65% mercury per ton, although some of the ore which was sent to the furnace ran as low as .15%, but the grade was brought up by high grade stringers carrying several percent. Here also it is indicated that no large body of ore has as yet been properly developed and when this mine is re-

opened it will probably be necessary to first spend a considerable amount of money in development before a steady production of ore can be expected.

An inspection of the accessible workings lead me to conclude that here also as at the Sunflower and Pine Mountain mines the better grade of ore occurs only in pockets or small lenses, and unless a large amount of exploration and development is carried on along with the production the operators are continually running out of ore for the mill. The mine was shut down at the time of my visit and each company that has operated in the past seems to have ended up with a deficit so that I cannot feel too optimistic in respect to the future although there is always a chance that some larger or richer ore body may be found in the future.

This mine is also fully described under the titles of the groups of claims, Red Bird, Ord and Rattlesnake, in Bulletin #122. of the University of Arizona.

DEPARTMENT OF COMMERCE  
Washington

March 28, 1930.

ATTRITION CONCENTRATION OF QUICKSILVER ORES

Conventional methods for the concentration of quicksilver ores have often been tried, but in general have been used successfully only under special circumstances. According to the United States Bureau of Mines, Department of Commerce, the metallurgical part of furnace treatment of relatively coarse particles of ore is usually so cheap and efficient that fine grinding for concentration purposes is seldom economic. Cinnabar, the chief ore form of quicksilver, floats readily, but at the present time only one quicksilver property in the United States has used this method successfully, and even then only for treating old dump material which was finely divided and contained considerable elemental sulphur, constituting an unusual and special quicksilver problem.

Hand picking and screening, though perhaps crude in comparison with the methods of concentration used in the non-ferrous mineral field, are more or less standard practice for quicksilver ores, and can usually be shown to be profitable. It has not been widely realized, perhaps, that for certain quicksilver ores, the attrition of the softer mineral constituents occurring in the crushing of rather coarse sizes furnishes a fairly satisfactory concentrating procedure. Recent work done at the University of California, with the informal cooperation of the Pacific Experiment Station of the U. S. Bureau of Mines, has shown that when quicksilver ores are "opalized," attrition concentration is ineffective, but that when the cinnabar occurs in certain sandstone formations, and when the crushing is carried out to avoid excessive fining, the range of sizes from 1/8 to 1/2 inch often shows marked concentration obtained by simple screening of the "attrition" product.

The attrition method is, of course, useless in the finer or coarser sizes, but in this range ratios of concentration as high as 10:1 have been obtained on typical ores. The mechanical part of the treatment of such ores deserves careful consideration by quicksilver operators as a means of increasing the capacity and yields of existing equipment, and especially so where quantities of partially weathered ores or dump material are available.

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FIRST FLOTATION PLANT INSTALLED IN PLATTEVILLE (WISCONSIN)  
ZINC DISTRICT

The recent installation of the first flotation plant in the Platteville, Wisconsin, zinc district is the culmination of early research by the United States Bureau of Mines.

In 1921 by the cooperation of the Platteville School of Mines, the mining operators, and the United States Bureau of Mines, a flotation process was worked out to clean the pyritiferous zinc ores. The matter lay dormant until

about a year ago when the operators offered to contribute toward another investigation, so that the newly developed flotation reagents could be used. The work was undertaken by the Mississippi Valley Experiment Station of the United States Bureau of Mines in cooperation with the Missouri School of Mines and Metallurgy at Rolla, Missouri. The new reagents tried did not yield better products than were obtained in the first tests, but they were better adapted to operating conditions, and for this reason the results were held in more favor.

After completion of the laboratory work, a pilot mill run in a commercial laboratory was made. In general, the laboratory results were confirmed and the pilot run brought out operating principles that could not be otherwise determined.

In the new plant, jigging, to reject a part of the gangue, is combined with flotation.

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#### CONCENTRATOR METHODS AND COSTS AT HAYDEN PLANT

A paper summarizing concentrator methods and costs of the Hayden Plant of the Nevada Consolidated Copper Company, prepared by W. I. Garms, mill superintendent, has been published by the United States Bureau of Mines, Department of Commerce, as one of a series of papers on milling methods and costs at representative operations in different mining districts.

The Hayden concentrator is located at Hayden, Arizona, about 20 miles from the mine at Ray. During the last quarter of 1928 an average of 10,366 tons of ore containing 1.25 per cent copper was treated daily in the plant. The average recovery during this period was 87.84 per cent of the total copper, the concentrate containing 19.88 per cent of copper. The present method of concentration is as follows:

The concentrator is divided into eight sections, each with a capacity of 1,500 tons per day. The sections are flexible enough to permit the treatment of as much as 2,000 tons each, although with poorer metallurgical recovery due to resulting coarser grinding.

Briefly, the operations at the coarse crushing plant and at the concentrator are as follows:

- (1) Coarse crushing by gyratory breakers and large rolls to 1-inch for shipment to the concentrator.
- (2) Fine crushing in a roll circuit from through 1-inch to through 10-mesh size.
- (3) Fine grinding in a ball mill circuit to 10 per cent on a-100 mesh screen.
- (4) Concentration by flotation of fine grinding product, producing finished concentrate and a reject tailing.

(5) Dewatering of flotation concentrate in settling bins and filters.

The paper includes tabulations of screen analyses of the heads and various products and distribution of the copper; average analyses of flotation heads, concentrates and tailings; distribution of copper by screen sizes in average flotation heads, concentrates and tailings; typical quarterly flotation plant report; metallurgical data; summary of costs per ton of ore treated; distribution of power; consumption of heavy supplies and ore treated per man per shift.

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SUBSIDENCE AND GROUND MOVEMENT IN COPPER MINES OF THE WEST

There are few phenomena connected with mining that are as inadequately understood as subsidence and ground movement, the United States Bureau of Mines points out. A vast amount of data have been collected relating to the failure of rock overlying mine workings, the action observed often being more apparent than real, and erroneous conclusions have been drawn.

With small workings the collapse of the walls and rock and consequent filling of the excavation does not reach to the surface unless the cover is slight; with more extensive workings there is not only a breaking down of the roof that extends to the surface, but a movement of the wall rock to close the excavation. The movement of the enclosing rock into the openings made in mining to establish equilibrium is known as ground movement. Similar movement in rock masses occurs in open-cut workings, on the banks of streams, and precipitous ground as cliffs.

The controlling factors in ground movement are the lines of weakness that exist in rock masses, which are: Bedding planes, contacts between various formations, faults, and the natural system of jointing existing in all rocks. Failure follows existing lines of weakness and does not break across solid formations except in the occasional breaking up of rock masses, that, too, usually being on joints.

Joints or slip planes exist in all rocks and are symmetrically arranged, the system in any locality being readily obtained by observations on the strike and dip. They indicate character and extent of movement to be expected except where other more prominent lines of weakness occur as outlined above. Combination of existing weaknesses in rock enclosing ore bodies furnish the key to the action resulting in subsidence and ground movement.

Imaginary lines connecting breaks on the surface with workings are usually extremely confusing and misleading, and rarely serve any useful purpose.

Field work on these problems is now in progress at the Southwest Experiment Station of the United States Bureau of Mines, Department of Commerce, Tucson, Arizona.

- - - - -

## A METHOD FOR DETERMINATION OF CADMIUM IN MILL AND SMELTER PRODUCTS

The use of the metal, cadmium, has increased greatly in the past few years, due to its application in steel plating. The metal is obtained as a by-product in the metallurgy of zinc. The minerals of cadmium almost invariably occur in very minute quantities, in zinc ores. The relative amounts of cadmium in the complex lead and zinc ores of the Salt Lake District in Utah range from negligible quantities, to one part of cadmium to 200 parts of zinc.

Because of the increasing importance of cadmium, research on the recovery of cadmium from zinc mineral concentrates is being conducted at the Inter-mountain Experiment Station of the United States Bureau of Mines, Department of Commerce, in cooperation with the University of Utah. In making this research, considerable trouble was encountered in determining the cadmium content of the various zinc concentrates and the products obtained in connection with the work, because of the chemical similarity of the elements, and because of small amounts of cadmium which were present as compared to the large quantities of zinc. An average zinc concentrate of this district contains 0.2 per cent of cadmium and 55 to 60 per cent of zinc. Ordinary routine analyses for substances which are relatively simple when compared to the determination of cadmium, are accurate when they differ by 0.1 or 0.2 per cent. Considering the content of cadmium to be dealt with, such accuracy is entirely inadequate. Several methods for determining cadmium, obtained from various sources, were more accurate than the percentage given above, but were long and complicated and caused a great deal of delay in the conduct of the work.

Accordingly, the literature was searched for methods, or parts of methods, that would be suitable for the purpose. As a result, a method was developed which was partly original and partly taken from the literature, which is of a degree of accuracy that is satisfactory, and is also short and simple.

The essential steps in the determination are solution in the usual way; precipitation of copper, bismuth, arsenic, and antimony with iron; removal of lead as the sulphate; separation of cadmium from manganese, zinc and iron by precipitation of the cadmium, with ammonium sulphide, as cadmium sulphide, in a solution of carefully controlled acidity; conversion of the separated cadmium to cadmium ammonium phosphate; ignition of the latter; and weighing as cadmium pyro phosphate.

The above determination is accurate to 0.01 to 0.02 per cent and can be completed in 24 hours, which time includes the overnight precipitation of cadmium ammonium phosphate. The method has been entirely satisfactory when applied to zinc concentrates and the various products obtained in connection with the experimental and research work that is being conducted on the recovery of cadmium from zinc concentrates.

\* \* \* \* \*

## MAZATZAL MOUNTAINS MERCURY DEPOSITS

In the Mazatzal Mountain, North of Roosevelt Dam, there is a wide spread showing of mercury mineralization.

Although there has been considerable development in the district on two properties, this is really an undeveloped and unexplored field as the two properties which have been worked are probably six miles apart and there has been very little prospecting in the back country between them, except by one or two men who have found and done a little work on cinnabar showings in various places which indicate that there is cinnabar over an area six or seven miles long, at least, and several miles wide.

I have been particularly interested in one property on which I now have an option. This is a group of twenty claims along a schistose-quartz-porphry belt, very uniform in character, and apparently carrying cinnabar and metallic mercury throughout its width of something over 200 feet. A tunnel driven into this for one hundred feet is the most extensive piece of work that has been done. This tunnel has been carefully sampled and shows an average, throughout, of 0.11% mercury, with thirty-five feet running 0.257% mercury, and individual samples running up to one-half percent, these being the figures from the lowest of the several different samplings. At various places on the property open cuts and pits show the cinnabar to be wide-spread in its occurrence and I have obtained assays of better than one-tenth percent, over a wide area directly on the surface. In panning the rhyolite, in its densest portions, it is remarkable to see what strong concentrates one gets in both metallic mercury and cinnabar.

Judging from this tunnel alone, I do not doubt that one could sort out enough tonnage to maintain a small operation by sorting out ore of better than three-tenths percent, but my own interest in the property is in the possibility of operating a plant designed for treating a large tonnage of low grade ore, much along the lines of later day developments in copper. I do not see why, with the same class of technique that has developed the treatment of low grade copper ore, both in the mining and metallurgical ends, we could not

develop the mercury business along the same lines and I believe that there is plenty of room in this district for investigating this possibility and, almost certainly, plenty of tonnage.

The development of this particular property I speak of could be cheaply done by diamond drilling. I have an estimate already showing that two thousand feet of drilling, which I estimate is enough to tell the preliminary story, could be done for \$6,000.00. I do not think I would want to go into the business on an extensive tonnage scale on ore of 0.1% but with that on the surface I believe the drilling of this property is justifiable, in the hope of finding a better average grade in depth. The whole country is made up of a uniform sheared schistose zone, dipping about 70 degrees and there is no reason why the values should not go to considerable depth.

In addition to the cinnabar showings I mention, my friends who have prospected this region have discovered other zones in the schist carrying cinnabar but, as there is practically no real development, it is impossible to say what they will amount to. I know of several places where you can see up to three feet wide of good looking cinnabar ore.

(signed) By:- W. M. Gohring

M. J. O'Brien, Limited

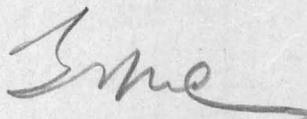
-2-

January 31st, 1939

Under the circumstances, I believe that you will wish to have me pay this account since Byrne really did a very good piece of work and saved us much annoyance and expense through keeping the Storm Cloud Property entirely out of the Bradshaw Bankruptcy proceedings. I believe that all of the other property which had been leased to the Bradshaw Company is still tied up in the bankruptcy and according to statement made to me recently by a banker in Presdott who represents the owner of one of these properties, they are having continued litigation which is most annoying and expensive.

I am accordingly submitting this matter for your consideration.

Yours very truly,



GMC:MF  
Enc. 2

~~5 Can a June~~  
~~1/2/20~~

Wazatal memory file

May 17, 1943

Mr. William Reynolds  
c/o Dick Robbins  
Box 64  
Scottsdale, Arizona

Re: Mercuria Mine

Dear Mr. Reynolds:

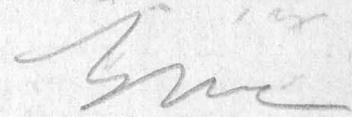
I have finally heard from my friend to whom I wrote concerning your property and apparently my letter followed him to New York and then back again to California, hence the delay.

I am sorry to say that he advises me that he would not be interested in investigating this property just at present since he has invested in another mine during the past few months and does not wish to take on anything else for the time being.

Should I make a contact with any other party who might care to look into your mine I will certainly bring it to their attention but it will be best for you to deal with other parties if an opportunity presents itself as I am pretty well tied up with work on copper and other metals and have not kept in touch with investors who are looking for mercury.

I shall always be glad to have you drop in when you are in Phoenix and tell me of any recent developments and I thank you for having brought this mine to my attention.

Yours very truly,



GMC:t

(2)

I cannot give you any <sup>definite</sup> address but  
may call in on Tuesday or Wednesday  
morning at the Montezuma Hotel, Nogales  
At which address you could wire me  
if there was anything very important  
& communicate.

Just find letters in my desk  
unless one ~~of~~ comes in from Alden  
in which case please telephone Mrs. Colm  
who will come down for it or  
have it called for.